

VOLUME 51  
No. 5

WHOLE NO. 231  
1939

# Psychological Monographs

EDITED BY  
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## STUDIES IN THE PSYCHOLOGY OF ART

Volume III

EDITED BY  
**NORMAN C. MEIER**

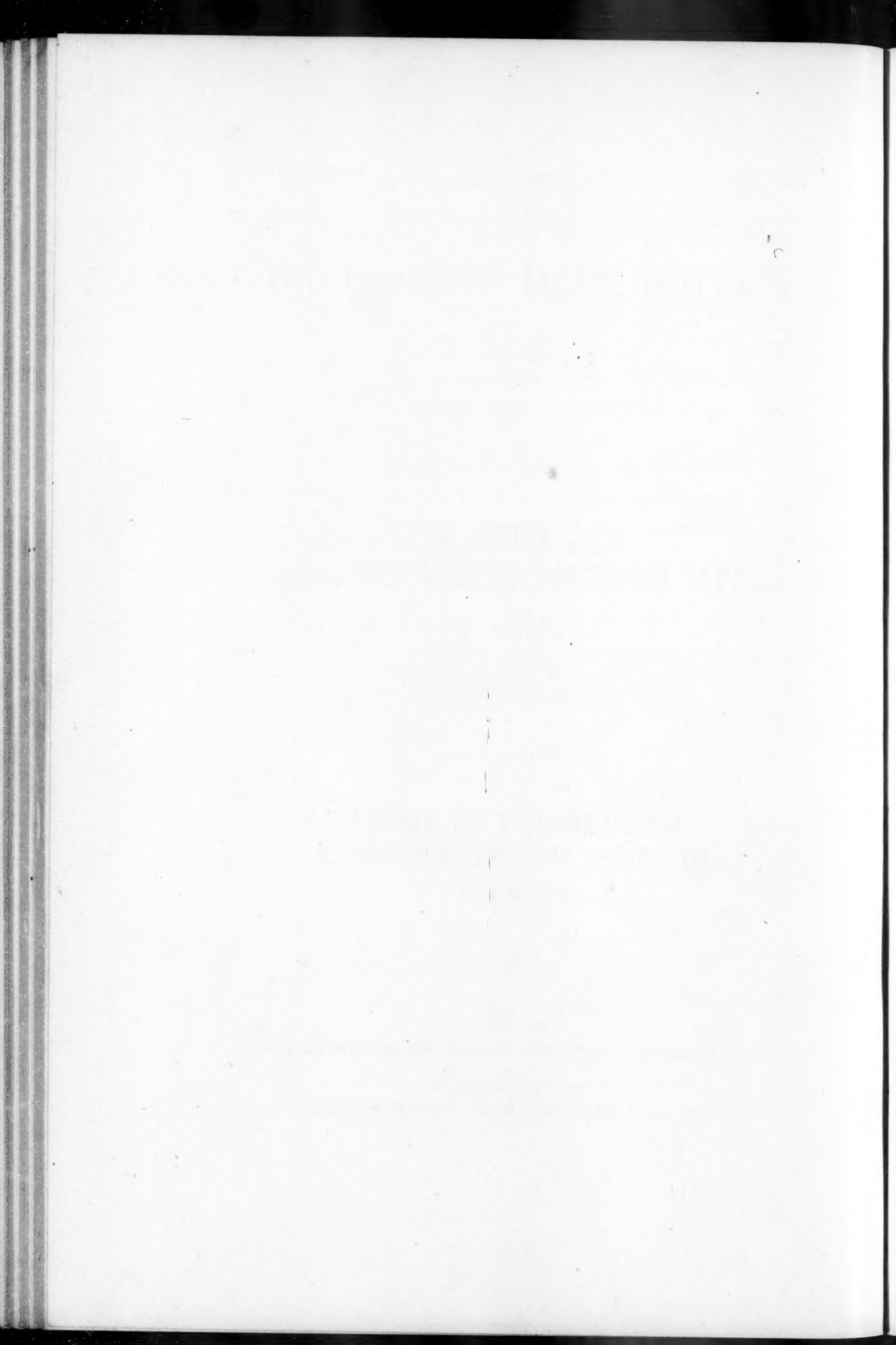
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## UNIVERSITY OF IOWA STUDIES IN PSYCHOLOGY No. XXIII

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PUBLISHED BY  
**THE AMERICAN PSYCHOLOGICAL ASSOCIATION, INC.**

PUBLICATIONS OFFICE  
**THE OHIO STATE UNIVERSITY, COLUMBUS, OHIO**



## INTRODUCTION

by

NORMAN CHARLES MEIER

The eleven studies of this Volume are presented as the third and final Volume of a ten-year investigation of the nature and variations of artistic capacity and factors affecting aesthetic response and learning in the art education field. Volume I, published in 1933, was concerned chiefly with the early genetic aspects of artistic capacity, while Volume II and the present Volume concern themselves primarily with the upper grades, high school and adult levels. The concluding study in this Volume presents for the first time a new theory of artistic aptitude based on all the evidence uncovered either experimentally, statistically or by case studies during the ten-year period. The program was sponsored by the Carnegie Foundation for the Advancement of Teaching with funds of the Carnegie Corporation of New York. Indebtedness is acknowledged to Dr. Frederick Keppel, President; to the original interest evinced by the late Henry Suzzallo; and to continued support by Dr. Walter A. Jessup, present Head of the Carnegie Foundation for the Advancement of Teaching. Two studies, those by Mundel and Kellett, received partial support from the Spelman Fund through the Iowa Child Welfare Research Station.

As in the other series of studies, the procedure involved a merging of psychological, art, and educational viewpoints and was participated in by research assistants representing all three interests under the guidance of the author. Most of the present investigations used either high school or college students as subjects. Acknowledgment is made to the generous cooperation on the part of superintendents, principals, and teachers in the public school systems of Milwaukee, Nashville, St. Louis, Des Moines and other cities.

While the present Volume is directly contributory to an enlarged understanding of the nature of artistic aptitude and creative ability, it also makes definite contributions to a further and deeper understanding of the psychological processes of perception, imagination, memory, to attitude interference in learning, and to individual differences.

The study by *Brighouse* introduced a fractionating tachistoscopic technique in a study of aesthetic apperception. In a manner designed to bring the response under careful experimental control, he has explored the manner in which past experience in the individual conditions his final perception of the structure of a painting projected for extremely brief periods of time. Through this procedure he has disclosed differences in the typical responses given by three classes of subjects—the artist, the non-artist, and children. The study has a bearing upon the relation between learning and depth of aesthetic appreciation, and discloses how a number of factors influence the type of response.

The study by *Kellett* takes up a problem in perception closely related to that investigated by Brighouse but follows a different technique. In its theoretical angle it was an attempt to discover whether the 'universal laws' of structurization hold for complex objects as a work of art as they do for simple geometric perceptual material. The procedure used materials matched in subject-matter—the artist's actual product with a photograph of the setting used by the artist. The study rests upon the assumption that the artistic product, being a result of selection, would be more unified than the static photograph. Control of conditions were approximate since the subjects were high school students and the experimental conditions dependent upon local conditions. The criterion of 'talented' or 'trained' was also not strictly possible to maintain through lack of authentic data. The study, in spite of these difficulties, offers some significant suggestions toward reorientation of objectives in art education for the general student.

The technique used in the *Clair* study approaches the case study or constant contact procedure, in that the investigator guides the individual subject through an involved procedure designed to

uncover the response potential. It is primarily thus an investigation of the limits of training and of individual differences in response to the more involved and advanced elements of aesthetic structure and art qualities. The study utilizes a new instrument, the check list, devised by Mrs. Clair, for the particular needs of the study.

The second stage of the study, in which language responses were eliminated, made it possible to explore the untrained aesthetic response in a region remote from art influences as understood in the ordinary sense. The recognition technique, while limited in materials, was reasonably adequate in subjects and offers an interesting finding on the learned aspect of aesthetic response.

Aesthetic judgment is believed by some to be strongly emotional and because of that fact is deemed more or less unpredictable. If it is primarily individual, emotional, and non-intellectual, then we would expect it to lack consistence if re-applied to the same object after a lapse of time. Whereas it may not be particularly desirable that aesthetic judgment be consistent it is of interest theoretically as well as practically to know to what degree it may or may not be consistent. In the former sense, if consistency should be found to be the case, we would have a strong position for asserting that aesthetic judgment is not necessarily emotional; in fact, it might even follow that sound judgment is hence based upon sound principles which function more or less consistently from time to time and with person to person.

This the *Cahalan* study attempted to establish by two means. Sketches from five American artists were obtained and photographed to a uniform size, then mounted on boards. A selected group of ten were ranked in order of excellence by all subjects, working independently. After an interval of approximately one year a re-ranking was made. The other means employed was through a special use of material in the Meier-Seashore Art Judgment Test. The evidence tends to support the belief in consistency.

The next four studies concern themselves with various types of creative imagination. The first *McCloy* study made use of the

creative composition apparatus described in Volume II (*Meier and McCloy*). This is a truly creative composition experiment, the subject composing by manipulating color in light reflections and objects with calling into play the same resources needed in the painting of a picture. It produced the surprising outcome that among a widely assorted collection of subjects including trained, untrained, and children the most creative compositions were made by a teen-age untrained girl!

The second *McCloy* study explored the field of passive creative imagination wherein the subject, instead of actively creating something, passively reacts: that is, faced with a strange composition made by some one else, he imaginatively places himself in the creator's place and attempts to discern what animated him. The lack of more definite findings in this procedure is possibly attributable to the difficulty of the material—abstractions that were too much outside the ken of many of the subjects, who were immature high school students.

The *McCloy* and *Meier* study used different materials and followed a slightly different approach. The materials were obtained by creating compositions with the apparatus referred to above, photographing them in full color on Leica Dufay film and mounting these, four at a time (all four in each case being variations of the same theme) on standard lantern slides. These, when exposed to subjects were reacted to by ranking and by selecting from a given set of fifty adjectives one describing the characteristic *mood* of the picture, and by giving reasons for identifying one of the four versions as the best. This process has been assigned the designation *re-creative* imagination because it necessitates the placing of the subject imaginatively in the mental atmosphere assumed by the creator of the composition in constructing the scene. As in the preceding study the materials involved such a complicated interrelation of compositional factors, subtle gradations of value and color significance as to be beyond the reach of most high school age subjects.

The *Meier* study, using abstractions for a part of the study, and a series of reproductions of paintings in color and in monochrome, representing varying degrees of abstractness and express-

iveness, for the other part, followed a still different approach to the study of creative imagination in subjects of high school age. The first part utilized a new technique, designated the *method of progressive perception*, in which the subject was led through five stages of response, each progressively built upon the one preceding. The second part followed a procedure somewhat abbreviated but retaining the feature of guided and controlled perception. Possibly the principal finding of this study is in its chiefly negative character, which if it may be assumed that the materials were not too far removed from the typical life experience of the average subject must indicate that deep-lying creative imaginative ability is not plentifully distributed in the general population. The practicability of the method is indicated, however, and also the diagnostic power of some of the materials to differentiate between groups.

Following the series on creative imagination, one study is presented on the educative procedures at the fifth and sixth grade level. The thesis here examined affects the question as to whether information alone (lectures on art, and art principles) not followed up by effective practice and review or not coordinated in any direct manner can result in learning progress. The evidence seems clear from the results of the study that coordination must occur if effective learning is to take place, at best at this level—but it strongly suggests that the conclusion need not be limited to any level. The *Mundel* study was a controlled learning experiment enjoying conditions which, though not ideal, were as good as usual circumstances ever permit.

The second *Brighouse* study is an interesting examination of a part of the thesis of Dean Birkhoff, and should have significance because of the introduction of types of subjects not usually available for a study of this kind.

The final study is the author's mature conclusions on the nature of artistic aptitude as the outcome of all data, published and unpublished, obtained in the ten years of directorship of the research program. The statement is purposely made brief, and abundant data and reference material could not be included for the reason that space here would not permit. A considerable

part of the supporting data is in the form of notes assembled from numerous contacts with established artists, and from long discussions of the various angles not only with artists but with teachers and art educators. To all such persons the author owes much, both for the data and for the wealth of ideas from which he has freely drawn, but also for the pleasure of knowing them as a group of remarkable persons.

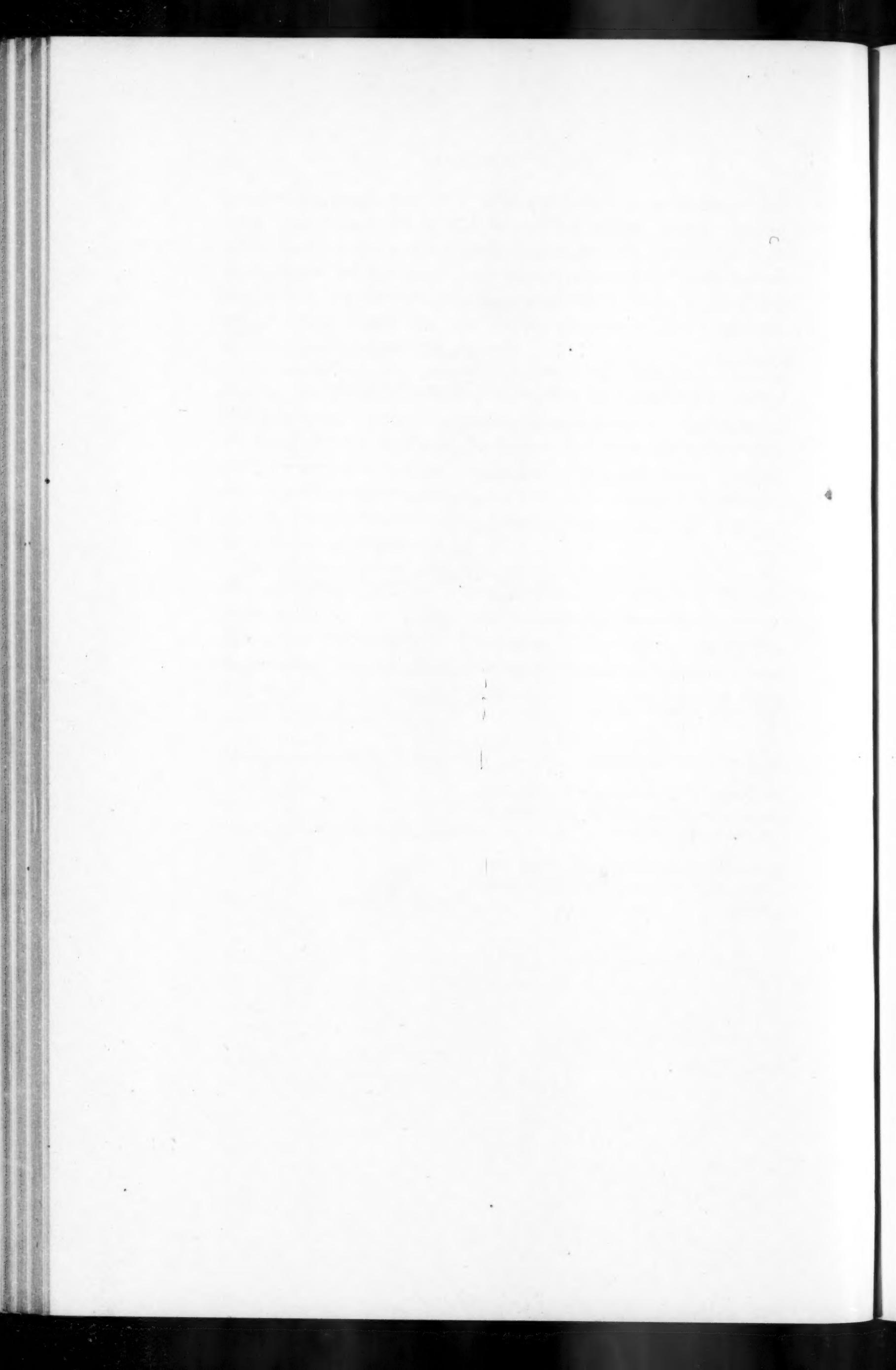
In concluding the research program, the author wishes to express his great satisfaction in having as co-workers twenty highly selected research assistants, representing various parts of the country, various schools of thought and contributing by their diversity of talent and backgrounds to a stimulating and fruitful evolving of research ideas, techniques and findings. Each one, serving from one to five years, brought something which enriched the experience of all.

Lastly the author expresses again his indebtedness to the Carnegie Foundation for the Advancement of Teaching and the Spelman Fund for making the studies possible and for their interest in the program. In making the studies possible the Foundations left the director completely free to determine how best to develop the program—the final conclusions are thus those of the director.

IOWA CITY, IOWA  
February 15, 1939

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## A STUDY OF AESTHETIC APPERCEPTION

by

GILBERT BRIGHOUSE

*I. Introduction.* This study is a part of the program "Genetic Studies in Artistic Capacity"<sup>1</sup> sponsored by the Carnegie Foundation for the Advancement of Teaching for investigation into the nature and development of artistic talent and artistic experience. The present study belongs in the division concerned with the nature and constancy of aesthetic experience. The specific purpose of the experiment reported here is a determination of the characteristic way or ways in which people apperceive the features of a painting and of the contrast between the apperceptions of the artistically trained and the untrained, and between those of children and adults. In addition, the experiment was devised to throw light upon the functioning of the aesthetic elements and principles in a painting.

*Definition of Terms:* The word "apperception" is here used to designate the process of acquiring a clear, focussed awareness of the *structure* of a painting. It includes both the perceptive function of acquisition of information (apprehension) and the critical function of evaluation (appreciation). Although this definition is wider than the traditional use of the term, the liberty is justified by the fact that there is unfortunately no word in the English language which expresses precisely the meaning desired here. The word "apperception" gives as close an approximation as could be found.

"Aesthetic" refers to the feelings of pleasantness and unpleasantness aroused by the qualities of beauty and ugliness in an art object. Although the term properly includes all forms of artistic expression, its application here is limited to the graphic arts.

<sup>1</sup> University of Iowa, under the direction of Professor Norman C. Meier.

*II. Historical Orientation.* Theories of aesthetic apperception are far in excess of actual experimental contributions. Of the former those which have the most direct bearing on this study are: (1) Physiological theories—in terms of smoothness of eye-movements, surplus neural energies, etc.; (2) Associational theories—that art objects are apprehended as pleasing to the extent to which they evoke rich associations; (3) Emphatic theories—that in aesthetic apperception we feel ourselves into the art object; (4) Psychical Distance theories—that aesthetic apperception is characterized by a disinterestedness of attitude toward the art object; and (5) Unity-in-Variety theories—that art objects are more pleasing the more they combine a variety within a unity.

The eye-movement theory has been shown to be aesthetically indifferent by Buswell (6) in a recent study. By the use of elaborate photographic recording apparatus, he demonstrated that aesthetic apperception cannot be explained in terms of eye-movements alone.

The second, the associational theory, was investigated experimentally by Külpe (13). He wished to remove the associational component from aesthetic experience by a tachistoscopic technique, but found that with exposures as short as three seconds associations still appeared. He therefore regarded his experiment as a failure.

Von Ritoek (19) studied empathy experimentally with the tachistoscope. She found that empathic feelings appeared with as short an exposure as two seconds, although less strongly than under normal conditions. Both Külpe (13) and Bullough (5) found similar results in other tachistoscopic investigations.

The present writer has found no references to experimental studies of psychical distance; and, since the unity-in-variety principle was investigated specifically by the procedure described in another article<sup>2</sup> in this Monograph, its discussion will be postponed.

*Scope of Present Investigation:* More experimental evidence, bearing directly on the apperceptive process, is needed before

<sup>2</sup> Brighouse, G., Variability in preferences for simple forms.

the nature of aesthetic experience can be thoroughly understood. The tachistoscopic technique lends itself to such a purpose. This procedure consists of the presentation of an image of a painting on a screen for a very brief interval of time, following which the observer reports verbally on what he has experienced. This procedure is repeated, continuing until the observer indicates that his apperception is complete.

This technique offers peculiar advantages for such a problem as the present one. Its application is subject to rigid scientific control. It can be administered in a far less artificial manner



FIG. 1. Front view of apparatus. Subject in foreground faces screen.

than eye-movement experiments, for example. Most particularly is it revealing because it permits a cross-sectioning of the apperceptive process, much as a microtome shows from slice to slice the course of microscopic structures. Thus one can trace the development of apperception with time. In view of these advantages it was felt that this technique should give insight into the nature of aesthetic apperception.

*III. Experimental procedure.* Throughout this experiment the conditions were kept as nearly uniform as possible. With but half-a-dozen exceptions, all the experimental sittings took place between eight A.M. and three P.M. so as to minimize

the effects of fatigue. All the experiments were conducted in the same quiet, darkened room. The observer was comfortably seated facing, and ten feet from, a white screen on which the paintings were thrown by a lantern slide projector. (Figures 1 and 2.) The tachistoscopic effect was produced by means of a fixed speed phonograph motor operating a silently rotating disk which interrupted the beam of light. An opening in the disk allowed the picture to appear on the screen for  $0.26 \pm .01$  seconds.

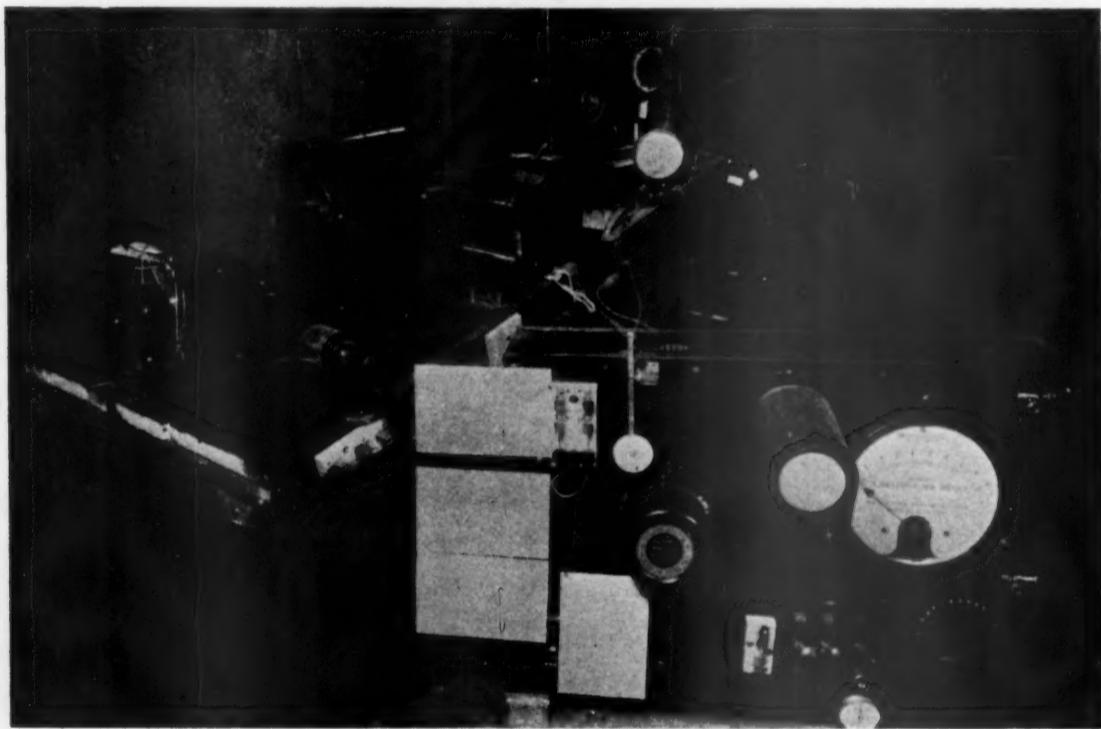


FIG. 2. Rear view of apparatus.

One important modification of the customary tachistoscopic technique consisted in the use of a *fixation area* instead of the traditional fixation point. The fixation area was produced by an auxiliary projector, fitted with changeable masks so that a patch of light was thrown on the screen of the same size, shape, and position as the painting which it preceded. An opening in the rotating disk allowed the fixation area to be projected for  $1.20 \pm .01$  seconds prior to the exposure of the painting, and the relative timing was so arranged that the fixation area blended into the painting without any sudden glare or shock. This procedure served three purposes: first, it gave the observer a clue to

the outlines of the painting, thus making inspection of any desired portion of the picture much easier; second, it induced partial retinal adaptation, thus preventing any startle which might otherwise make the exposure less effective; and third, this method avoided the predisposition or bias towards the center of the picture which a fixation point would give.

Inasmuch as the paintings were not equally brilliant it was necessary to introduce into the auxiliary projector circuit a rheostat which was set separately for each picture. After preliminary experimentation it was decided to make the brightness of the fixation area equal to one-half the mean brightness of the corresponding painting, as measured by photometer, and the rheostat was thus set before beginning experiments with each picture. It was found that this brightness relation provided sufficient retinal adaptation to give a comfortable transition from fixation area to painting without startling the observer.

Uniform instructions were given to each observer as follows:

"In this experiment I am going to project a picture on the screen for a very brief period of time. First, I shall say 'Ready'; then two seconds later you will see a patch or rectangle of light on the screen, like this (projecting fixation area). This light patch is of the same size and shape as the picture which is to follow, and so it will show you where to be looking. After this light has been on for a brief interval, it will flash off and the real picture will appear for a quarter of a second. So that you will know just what to expect, we will do the whole thing over once or twice with a sample picture which we shall not use for the real experiment. Like this: 'Ready'; 'And again'. (Here a sample slide was projected tachistoscopically.)

"As soon as the picture has disappeared I want you to tell me everything you have experienced, everything which has passed through your mind. Try to tell me every single thing which occurs to you, whether it seems important or not. When you have told me everything for that exposure, say 'That's all'. Then I shall again give you the ready signal, the patch of light, and the same picture, and again you are to tell me everything which passes through your mind. We will keep on doing this until you feel that you have seen the picture completely, so that nothing fresh occurs to you with further exposures. When you feel that you have perceived the picture as thoroughly as you can with these brief exposures, tell me; we will then leave the picture up there for you to look at as long as you wish. If you recognize the painting as one you have seen somewhere before, tell me at once. As soon as you know whether or not you like the picture, tell me at once."

(After the observer had expressed himself as satisfied that he had seen the picture enough—) "Do you like the picture now? Tell me now what differences you find between what you saw before with the short exposures, and what you see now."

Occasionally children would exhibit shyness on the first picture, and they would then be encouraged to proceed with such instructions as: "I'm sure you were thinking of something just then; can't you tell me what it was?"

For adult observers each sitting occupied from forty minutes to one hour, with brief rest periods between each picture while the slides and fixation area masks and intensities were being changed. Some observers were able to complete the ten pictures at one session, but the majority required three sittings each. Two observers were unable to complete one painting at a single session, and for them the sitting was broken into two, two days apart. For children the duration of each sitting was limited to twenty minutes to offset fatigue and distractibility. Most of the children served at four sittings each.

No records were used when a picture was recognized by an observer as one that he had seen before. Where such recognition took place, it was usually on the first exposure, invariably by the third.

Ten paintings, representing a wide variety of subject-matter and of method of treatment were used, as listed in Table I.

TABLE I. *List of paintings*

Artist	Title	School	Kind of Slide
Renoir	Cup of Chocolate	Impressionism	FCP
Landseer	Saved	Romanticism	Achr.
Braque	Harbor in Normandie	Cubism	HC
Kokoschka	Lyons	Expressionism	HC
Reynolds	Angels' Heads	Romanticism	HC
El Greco	View of Toledo	Baroque	HC
Di Giusto	Agony in the Garden	Italo-Primitive	Achr.
Cezanne	Card Players	Post-Impressionism	Achr.
Ufer	The Solemn Pledge	Naturalism	HC
Hokusai	The Great Wave	Ukyoye	Achr.

Records were kept on check lists on which space was provided for noting the number of the exposure on which each item was mentioned. A tally of aesthetic references was kept separate from those pertaining to subject-matter.

Under "Kind of Slide" the abbreviations have the following meanings: FCP=Finlay Color Plate; HC=hand-colored; and Achr.=achromatic.

Records were obtained on a total of ninety-four observers, of whom twenty-two were children from eight to fourteen years of age. They will be referred to here as the "C" Group. The remainder consisted of university students and faculty. Of the adults thirty-four were either graduate students and faculty in the Department of Graphic and Plastic Arts of the University of Iowa, or else had majored in that department for a minimum of three years. These thirty-four observers are classified as the "Artistically Trained" or "A" Group. The remaining thirty-eight had received little or no instruction in fine art and were labeled the "Artistically Untrained" or "N" Group.

TABLE II. *Frequency distribution of total exposures*

No. Exposures	Group			All
	Artists	Non-Artists	Children	
1- 4	37	39	42	118
5- 9	64	68	114	246
10- 14	37	14	32	83
15- 19	19	11	8	38
20- 24	12	11	2	25
25- 29	2	2		4
30- 34	3			3
35- 39	1	1		2
40- 44	1	1		2
45- 49	1		1	2
50- 54		1		1
55- 59	1	1		2
60- 64		1		1
65- 69				
70- 74	1			1
75- 79				
80- 84				
85- 89	1	1		2
90- 94	1			1
95- 99	1			1
100-104	1			1
105-109				
110-114				
115-119	1	1		2
120-124				
125-129				
130-134				
135-139				
140-144				
145-149				
150-154				
155-159				
160-164				
165-169		1		1
Total	—	184	153	199
		—	—	536

*IV. Results.*

*Variation in number of exposures:* As explained in the preceding section, each observer regulated for himself the number of exposures for each painting, because he was instructed to proceed until he felt that he had apperceived the painting as thoroughly as he could. Under these conditions marked differences appeared in the number of exposures required by each observer. There was a range from two exposures (of the painting by Reynolds, for an untrained adult) to 167 (of the Di Giusto, also for an untrained adult, with a median number for all observers for all paintings of 10.6 exposures. Table II presents these differences in frequency distribution form, and Table III shows the median number of exposures for each painting.

TABLE III. *Median number of exposures*

Paintings	Group			All
	Artists	Non-Artists	Children	
Renoir	11.4	16.1	7.5	11.6
Landseer	8.6	6.5	6.5	7.2
Braque	10.6	7.3	6.3	8.2
Kokoschka	14.2	14.8	6.6	8.2
Reynolds	7.1	6.7	5.9	6.5
El Greco	15.7	10.0	7.4	11.3
Di Giusto	32.1	26.8	8.5	22.5
Cezanne	13.6	8.8	8.4	10.4
Ufer	10.9	10.8	7.4	9.6
Hokusai	8.2	6.3	7.2	7.3
All Paintings	13.2	11.4	7.2	10.6

The difference between the number of exposures requested by children and those by adults can perhaps best be explained in terms of the ready distractibility of the former, only one of whom took more than twenty-four exposures for any one painting. For the children there was no significant difference between the paintings. There is a statistically reliable difference between the median total exposures for the artistically trained adults and the median for the untrained, but this difference is beclouded by the differences between the paintings. It is noteworthy that the Di Giusto required a median of 32.1 exposures for the "A" Group, against 7.1 for the Reynolds and 8.6 for the Landseer. Examination of these paintings will reveal that the differences

between the Di Giusto and the Reynolds are explicable to some extent in terms of subject-matter complexity.

The Landseer, however, with its photographic exactness, has almost as much detail as does the Di Giusto. The cause for the difference in number of exposures here, as revealed by the verbal reports, lies in the intriguing compositional pattern of the latter for the "A" observers. The significance of this will be discussed in the final section.

*Immediacy of hedonic response:* Among the instructions given to the observers in this experiment was the request "As soon as you know if you like the picture, tell me at once." If the observer gave no reply to this by the fourth exposure, he was asked: "Do you know yet if you like this picture?" Seventy-eight per cent of all children and untrained adults gave replies, either of pleasure, indifference or dislike, to the first exposure. Ninety-seven per cent replied by the fourth exposure. When each picture had been completed and was being viewed normally the observer was asked: "How do you like this picture now?" At this point the untrained adults and the children made practically no corrections of their initial judgments. That is, over three-quarters of these observers knew after one exposure of approximately one-fourth second whether or not they were going to like the picture, even though they had apprehended only the most general features.

This suggests that for artistically unsophisticated observers a simple form of aesthetic experience is immediately given in consciousness and that it persists to color the succeeding process of accumulating apperception. This immediate hedonic tone is probably mediated by recognition of the "story-telling" content of the painting. With fuller apperception on succeeding exposures this effect is enriched and reinforced by accumulating information.

For the artistically trained observer the process is considerably complicated. These individuals frequently showed hesitancy in committing themselves to an early expression of affective reaction. Only to the Landseer and the Reynolds did the majority give feeling responses on the initial exposures. By the fifth exposure only 55% had expressed any hedonic tone and these

were frequently given tentatively and with qualifications. Further, there was a much greater tendency to make later corrections and modifications than was the case with the untrained observers, who were characteristically quite positive in their expressions of pleasure and displeasure.

This suggests that for the artistically trained observer the immediate hedonic tone is minimized in importance, and that his aesthetic experience is much more a matter of carefully weighed judgment than the quick impression of the artistically unsophisticated. That this is not merely a matter of greater cautiousness is shown by the fact that a number of normally impulsive personalities were included in the "A" group. Rather it seems that these individuals went through a process akin to that enjoyed by the wine connoisseur, who first examines the bouquet for some moments, then slowly and critically rolls the liquid around his mouth with his tongue, and finally swallows it with relish. Compared with this the untrained observer may be said to swallow his art at one gulp.

*Apperceptive stages and types:* Three stages or levels of apperception were distinguishable in the verbal reports. The first of these dealt with general masses (*e.g.*, a woman, a table, etc.). This is perhaps the kind of perceptual survey which the casual observer gives in passing the paintings in a gallery. It undoubtedly corresponds to the rapid series of short eye-fixations over the general area of a picture which Buswell reported (6). All observers in the present study gave this sort of "mass" report on the first two or three exposures.

The second stage consisted in a greater and greater concentration upon small areas, with emphasis on fine detail. This level is related to Buswell's longer, more concentrated eye-fixation pauses. This kind of report was characteristic of both trained and untrained adults, but in general the children reported little detailed material, being content with the major masses.

A third or integrative stage was reached by three of the untrained adults and all of the "A" group. This was true only for certain pictures, notably the Di Giusto, El Greco, and Kokoschka, less markedly for the Renoir, Hokusai, Cezanne,

Ufer, and Braque. This stage was absent for the Landseer and Reynolds. It consisted essentially in a series of observations on relations between previously-observed features. Typical observations were: "Now I am keenly aware of the value pattern"; "The composition would be seriously marred by the omission of that dark mass lower center"; "The repetition of that same curve by the lower wave is peculiarly satisfying"; "Now I am going to see if I can tie in that texture pattern." This level, where it occurred, occupied the last exposures, often overlapping the second stage, and it included the development of the most complete aesthetic responses. It was probably here that the artistically trained observers realized their richest appreciations. The earliest reports on this stage referred to value relationships. Line, texture, and form patterns were sent next, and color organization last.

With many exceptions, the relation between apperceptual stages and training of observers can be summarized as follows:

- Stage 1. Masses:* Initial exposures for all observers for all pictures.
- Stage 2. Detailed observation:* Intermediate exposures for adults only for all pictures.
- Stage 3. Integration:* Terminal exposures for artistically trained adults only for certain pictures.

This discussion has an important bearing on the whole problem of "perceptual types" which, particularly in British and European circles, has received marked attention in recent years. Binet (4), in 1903, suggested that individuals fall into four classes perceptually, the descriptive, the observing, the erudite, and the imaginative. Other classifications have been Aveling's (3)—symbolic and asymbolic; F. Müller's (16)—descriptive, observing, emotional descriptive, emotional observing, erudite descriptive, and erudite observing; Bullough's (5) and Myers' and Valentine's (17)—objective, subjective, associative and characteristic; Feasey's (9)—pattern and picture types; Külpe's (13) and Rowland's (20) and Karpinska's (11)—peripheral and central; and Otis' (18)—constructive and destructive.

The data of the present study will not readily conform to any one of these classifications. An observer who was "objective" on one picture or on one day might be "subjective" on the next, and so on. In view of the wide divergencies it seems wiser to forego any attempt at rigid and arbitrary classification of this sort. Instead it should be stated that there were merely general tendencies for each observer to give a preponderance of responses on one or another of the levels described above.

*Perceptual sequence:* The order in which the various features of a painting are apprehended is of significance both psychologically and artistically. Contemporary aestheticians have been particularly concerned with this problem, and they have set forth a variety of theories of the sequential effect of various compositional principles. One of the most publicized of these is the postulation of Hofmann and Cheney (7) that in a work of art the features are so arranged as to lead the attention in a "dynamic tension path" through the planes of the picture.

Some light may be thrown by this experiment by determining the mean exposure at which each of the features of the painting is first reported. Fig. 3 shows these sequences for one painting. The figures are given in pairs, of which the upper represents the initial report for the "A" group, and the lower for the untrained adults and children.

The characteristic tendency is for the central features to be apprehended early, with extension of information out to the periphery coming on later exposures. The detailed observation of later exposures, as described under the preceding rubric, is indicated by the fact that small objects are seen later than are large ones. A general spiral tendency from center out is noticeable in the majority of the paintings.

The perceptual sequence for the Di Giusto is particularly interesting because this painting is one which has been discussed in detail by Cheney. According to the Hofmann tension path theory, as interpreted by Cheney, the perception of this painting should be developed as follows: "The eye, drawn in by the linear lift of the upflowing river, pauses momentarily at the group of Disciples; continues left and up, is turned from the corner by a complex of vaguely recognizable natural forms—mountains,

town, wall; is carried along the heavily accented valley of foliage; is drawn around the central peak by the bit of bush beyond; is pulled forward and right by the Angel; falls to the trees, turns inward again, and centerward, to come to rest at the head of Jesus. So varied is the most obvious example of what I have variously termed the way of vision, the tension-path, and the skeleton of the plastic structure." (7, pp. 147-8.)

This theoretical perceptual path is not in accord with the experimental perceptual path for artistically trained observers of these pictures. Results as found in the El Greco are shown in Fig. 3. These discrepancies may be taken as evidence tending to favor



FIG. 3. Perceptual Sequence in the case of El Greco. Figures give mean initial exposure at which each feature was first reported. Upper figure is that for trained adults; lower figure for artistically untrained adults and children. [Courtesy of Metropolitan Museum of Art.]

the Hofmann principle although it is a refutation of this particular application of that principle.

*Emphasis:* One of the most frequently discussed aesthetic principles is the dominance of the so-called "center of interest". It is supposed to be this principle which most distinguishes a painting from a photographic reproduction, in which subordination of irrelevant detail is hard to achieve. The technique used here provides a means for determining the degree of centering of interest on each of the features of the paintings studied. This was done by finding the percentage of references to each feature out of the total of subject-matter reports.<sup>3</sup>

It was found that each artist has succeeded in achieving a certain degree of emphasis, although this is less clear-cut in the case of the Landseer and the Reynolds than for the other pictures. In each of these there is a tendency for conflict between centers, for the former between the dog and the figure of the child, and for the latter between the five heads.

The Di Giusto exhibits a particularly successful gradation of domination, from 26% for the central figure, to 20% for the disciples, to 12% for the cherub and 7% for the upper left motif. Here is perhaps the organizational principle which makes this a particularly well-composed painting.

Two of the pictures used here had been experimented with by Buswell in his eye-movement studies discussed in the preceding chapter. A fair degree of correspondence ( $r=.73$ ) was noted between the results obtained here and Buswell's report on clustering of eye-fixations.

*Balance of Attention:* The balance of attention on either side of the center of the paintings may be measured by taking for each side the sum of the products of the number of references to each feature times a moment which expresses the distance of each feature from the center line. These moments were obtained by an arbitrary division of the paintings into ten vertical strips and numbering them from the center out. A mechanically

<sup>3</sup> Detailed analyses of each painting are contained in the doctoral thesis entitled "A Study of Aesthetic Apperception", in the library of the State University of Iowa.

balanced picture would have equal products on each side. Table IV shows the ratios between the sums of these products for each picture. This relation may be called the "ratio of imbalance". Negative values indicate greater weight on the left, positive values on the right side of the center lines.

TABLE IV. *Ratios of imbalance*

Painting	Ratios	
	Artists	Non-Artists and Children
Renoir	-1.3	-1.4
Landseer	-2.9	-3.0
Braque	1.4	1.2
Kokoschka	1.3	1.4
Reynolds	-1.0	-1.4
El Greco	1.5	1.4
Di Giusto	-1.2	-1.3
Cezanne	1.2	1.2
Ufer	1.5	1.8
Hokusai	-2.8	-3.0

The important conclusions from this table are first, that none of the paintings are in perfect mechanical balance, but each deviates somewhat to right or to left. This is perhaps an example of the aesthetic principle of artistic deviation from the mean suggested by Seashore and Metfessel (21) as an explanation of the effectiveness of the vibrato in music. While perfect mechanical balance would be uninteresting in informal arrangements, on the other hand too gross an imbalance is disturbing. A median range will include the most effective works of art.

Second, the differences between the paintings are revealing, the Reynolds representing the least deviation and the Landseer the most. The latter probably exhibits too high a ratio of imbalance to be a completely successful composition. On the other hand the Reynolds is so nearly balanced geometrically that it lacks compositional interest. The Hokusai has a great preponderance of weight on the left, but the sweep of the lines to the right seems to counteract this sufficiently to preserve a pleasing balance.

Third, the "A" observers show a greater striving for balance than do the untrained. Such comments as the following corroborate this: "The thing seems heavy on the left; there ought to be something way over on the right to correct that, but I

haven't found it yet." Because such needs were felt by the artistically trained group, their attention was so directed as to provide a closer approximation to equilibrium. It is recognized that these figures represent balance of attention; such subtle and complicated forms of balance as that of volumes, tones, textures, etc., are not amenable to study by this method.

*Variations in responses having aesthetic reference:* One method of analysis of the verbal reports consisted in the determination of the relation between the amount of material reported on subject-matter and the amount given on the aesthetic qualities *per se*. This relation was found by computing the total references under each of these headings on the check lists. Table V gives the percentage which the aesthetic response total is of all

TABLE V. *Mean aesthetic terminology ratios*

Painting	Group			All
	A	N	C	
Renoir	43.8	27.2	19.4	30.1
Landseer	15.8	9.9	9.0	11.6
Braque	71.2	59.3	19.9	50.1
Kokoschka	47.3	19.7	17.6	28.2
Reynolds	18.7	22.7	16.0	19.1
El Greco	54.6	32.7	23.8	37.1
Di Giusto	41.5	16.3	6.7	21.5
Cezanne	26.2	4.7	3.3	11.4
Ufer	31.6	18.0	19.2	22.9
Hokusai	50.4	27.2	11.2	29.6

responses. Wide differences will be noted between the pictures and between the groups of observers. In the first place it is evident that the vocabulary of the children in this experiment is characterized by a greater percentage of subject-matter responses than is that of the untrained adults, who in turn show more subject-matter reports than do the artistically trained. This relation might have been expected, but whether it is an indication that the "A" group really saw more aesthetic qualities in the paintings, or whether it simply shows that their art training has saturated their language with art terminology, is a question of considerable pedagogical significance. Undoubtedly the latter explanation—artistic garrulity—would suffice for some of the observers. However, early sections of this chapter have given

ample evidence that a majority of the "A" group were not merely more articulate but really did see a great deal more of artistic significance than did the untrained observers.

It is of interest to inquire why there should be such marked differences between the capacities of these ten paintings to elicit aesthetic responses. It is clear that where subject-matter is semi-abstracted, as in the Braque, description must needs fall back upon aesthetic terminology. Certainly this is true of adults. Even with as abstract a painting as this, however, the children used less than 20% aesthetic terminology. With them the desire for "recognizability" of the features of a painting is so dominant that even where no object is directly represented they read one in.

Table VI shows the rank of each picture for each group on the aesthetic terminology ratio. In this table the four achromatic pictures are indicated by asterisk. It will be seen that whereas for the "A" group these four have ranks of third, sixth, eighth, and tenth, for the "N" observers they rank fourth, eighth, ninth, and tenth, and for the children seventh, eighth, ninth, and tenth. Clearly the children are depending on color in aesthetic description far more than do the trained adults.

TABLE VI. *Rank order of paintings on aesthetic terminology*

Rank	A	N	C	All
1	Braque	Braque	El Greco	Braque
2	El Greco	El Greco	Braque	El Greco
3	* Hokusai	Renoir	Renoir	Renoir
4	Kokoschka	* Hokusai	Ufer	* Hokusai
5	Renoir	Reynolds	Kokoschka	Kokoschka
6	* Di Giusto	Kokoschka	Reynolds	Ufer
7	Ufer	Ufer	* Hokusai	* Di Giusto
8	* Cezanne	* Di Giusto	* Landseer	Reynolds
9	Reynolds	* Landseer	* Di Giusto	* Landseer
10	* Landseer	* Cezanne	* Cezanne	* Cezanne

In view of the high repute in which the work of Cezanne is held by contemporary critics, his low rank on Table VI demands some explanation. Possible causes are: that this particular picture is not one of his best; that its achromatic use here militates against its maximum effectiveness; that its greatness lies not in beauty but in completeness of expression of feeling; or that the observers in this experiment lacked the insight necessary to appreciate fully. Perhaps each of these explanations operates to some

degree, although the last gains credence from the fact that this picture ranks two places higher for the "A" observers than for the others.

The interchange in position of the Di Giusto and the Reynolds for the trained adults and the children is indicative of the greater appeal of children's subject-matter and the relative lack of appeal of the religious motif. For the "A" group, however, the Di Giusto elicited a large number of aesthetic responses related especially to pattern, rhythm, and balance.

A sampling of thirty-five observers was asked to rank the ten pictures in the order in which they liked them. Between this rank and the rank on the aesthetic terminology ratio there was a correlation of .55.

*Psychical Distance:* No sharp, clear-cut evidence for a psychical distance theory of aesthetic apperception was obtained in this study. There was frequently manifested a greater disinterestedness of attitude by the artistically trained observers towards the "story" of the paintings. On the other hand, the untrained observers and children would make such reports as the following: "That fellow standing on the left looks like a worthless, shiftless sort; I don't like him" (Cezanne); "I'm just thrilled by the devotion and heroism of that dog" (Landseer); "The little girl on the lower left looks 'sappy'" (Reynolds); and so on. The reports of the "A" group were characteristically much more impersonal towards the "story", but with strong feelings toward some of the compositional elements of certain of the pictures. Typical examples are as follows: "I love the sweep of that line" (Hokusai, Di Giusto, El Greco, and Kokoschka); "The obviousness of arrangement is insipid, it annoys me" (Reynolds); "Those rose tones are gloriously rich" (Renoir).

The relation may be shown graphically thus:

Subject—N & C

A

Composit.—A

N & C

where linear distance is proportional to psychical distance. However, between the disinterestedness of the trained observer toward subject, and of the untrained observer toward composi-

tion, there exists the fundamental difference that the "A" observer is cognizant but detached, while the "N" individual is indifferent because unaware.

*Empathy:* Only meagre suggestions of empathic responses were obtained in this experiment. The nearest approach was in reports on the sweep of line in "The Great Wave", but even here the evidence was not conclusive. The reason may be: that empathic feelings are minimized under those conditions; that the paintings used here are incapable of eliciting such responses; or that the observers used in this study were insensitive to empathic stimuli.

*Richness of associations:* One prominent aesthetic theory—Addison (1), Alison (2), and Fechner (10)—states that an object is apprehended as beautiful to the extent to which it evokes an abundance of pleasing associations. The directions given to the observer in the present experiment permitted reports on all associations which were aroused by the paintings, and a number of observers indicated associational experiences. However, such reports were far more characteristic of the artistically untrained adults than of either of the other two groups. Such a result tends toward disproof of the association hypothesis in aesthetics. At least under these conditions, the artistically trained observers were too absorbed by compositional interests to be led down associational by-paths.

*Eidetic imagery:* Two of the ninety-four observers in this study gave distinct evidence of possession of eidetic imagery. One of these was an artistically unsophisticated adult woman, the other a girl of thirteen. In both cases the reports from the first five exposures were much richer than with the majority of observers, and both, if questioned about the details of a picture, would stare hard at the blank screen and then give correct or nearly correct answers. Neither had been previously aware that her visual imagery was richer than usual, but each said that she could call up vivid images of home, family, etc. Neither gave any evidence of particularly appreciative attitudes toward art, and it seems doubtful if eidetic imagery, as such, plays an important rôle in aesthetic apperception.

*V. Summary and conclusions.*

*Summary:* The purpose of this experiment was an investigation of the characteristic processes whereby an individual apprehends and appreciates the structure of a painting. Apperceptive development was studied by means of a tachistoscopic projection apparatus with variable prefixation area, with which ten paintings, representing a wide range of subject-matter and technical treatment, were shown individually to ninety-four observers. Each observer regulated for himself the number of exposures which he desired for each picture. The range of exposures was from 2 to 167; the duration of each exposure was  $0.26 \pm .01$  seconds.

*Conclusions:* I. Maturity of aesthetic apperception is characterized chiefly by its dynamic nature, suggesting Zane's distinction between active and passive appreciation (22). When observing a painting, the artistically trained observer shows far greater mental activity, of a carefully directed kind, than does the artistically naïve individual, whose observations are random, undirected, and less strongly motivated.

This dynamic character of aesthetic apperception appears in the form of (1) prolonged observation of those paintings whose compositional organization is classifiable as "creative" or aesthetically significant; (2) verbal reports indicating strong motivation toward a self-conceived objective; (3) a temporal delay of the affective response, which is characteristically held in abeyance until relatively late in apperceptual development; (4) the emergence of verbal responses of an integrative or constructive nature where the painting under observation presents opportunities for such synthetic activity; (5) a somewhat better balance of attention between the two sides of a composition; (6) a nicer gradation of centering of attention; and (7) fewer aesthetically irrelevant associations.

Further, artistic maturity tends to be revealed in a saturation of the vocabulary with art terminology; in greater "psychical distance" or detachment from the subject-matter or story-telling qualities of a painting; and in less "psychical distance" from compositional organization.

II. From the genetic point of view, artistically untrained adults in general show only slightly greater artistic maturity than do children. The latter were satisfied with fewer exposures and responded chiefly to the larger masses and stronger movements of each painting. Also their art vocabulary was naturally less complete. However, on all the other criteria of artistic maturity cited above the children showed almost equal development with artistically naïve adults. The implication for art education is clearly that by the age of ten or eleven (the mean age of the child observers in this study) the individual has ordinarily reached a plateau of artistic maturity on which he is likely to remain through adulthood unless given art training of a high order. Since this experiment was not so devised it does not reveal what particular kind of training is best calculated to promote artistic maturity. Inspection of the verbal reports, however, makes it seem doubtful whether the criteria outlined above can be satisfied by that art instruction which seeks chiefly the mastery of technical skill in reproducing classic art forms. Clearly artistic maturity as defined here demands deeper understanding than can be acquired by drill on draftsmanship alone.

III. This experiment proved itself to be a useful technique for studying the functioning of the aesthetic principles of emphasis, balance, and sequence in a painting. The ten compositions used here showed wide variations in the attainment of these principles. Two paintings (El Greco and Di Giusto) achieved particularly successful gradations in emphasis; two (Reynolds and Landseer) gave evidence of conflicts of interests; the other paintings lay between these two extremes. Each picture showed a slight deviation from rigid geometrical balance of interest, but in the case of the Reynolds this divergence was slight, while the extremes of deviation were shown by the Landseer and Hokusai. There seems to be here an illustration of the aesthetic principle of slight artistic deviation from the mean.

IV. The results indicate a need for clarification of the concept of "psychical distance". Artistically mature observers show rather complete detachment from subject-matter interests, but very close and personal responses to picture organization.

V. The experiments failed to reveal any clear-cut evidence either for or against an emphatic theory, but the results tended to refute both the "association" and the "eidetic" imagery theories of aesthetic apperception.

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# A GESTALT STUDY OF THE FUNCTION OF UNITY IN AESTHETIC PERCEPTION<sup>1</sup>

by

KATHRYN R. KELLETT

*I. Introduction. A. Theoretical orientation.* In the welter of mutual misunderstanding and one-sided emphases which characterize aesthetic speculation on the nature of the aesthetic experience, only one desideratum stands forth unequivocally—UNITY. Aestheticians agree to the *value* of the immediate totality of effect produced by a work of art, even though they may disagree widely over the means of achieving this resultant unity, the inclusiveness of the term (purely formal, fusive, purely expressive), the means of apprehending the totality, and the criteria of unity.

The problem of the psychological phenomenon of integration is certainly at the core of the aesthetic experience since works of art are admittedly *created* as units and *felt* as units and *apprehended* as units. Yet, so far, theorizing has far out-distanced empirical evidence on the question. Typical of the aestheticians' definitive statements of the scope and function of unity are the following:

1. *Neuhau*s (29) : unity as a combination of parts resulting in an effect aesthetically pleasing.
2. *Bell* (3) : significant form.
3. *Chandler* (6) : parts belonging together in the exact arrangement they have.
4. *Prall* (33) : high in the scale of being coherently held together for perception.
5. *Flaccus* (11) : (1) the impression of a single creative will ;  
(2) single pleasing visual image ;  
(3) unity of purpose and spirit.

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<sup>1</sup> An investigation in the research program, Genetic Studies in Artistic Capacity, directed by Dr. Norman C. Meier and sponsored by the Carnegie Foundation for the Advancement of Teaching with financial aid from the Carnegie Corporation. This study received aid also from the Spelman Fund through coöperative arrangements with the Iowa Child Welfare Research Station.

6. *Cox* (8) : fusion of line, form, and color into one moving entity.
7. *Barnes* (2) : integration or balance of the factors of plastic form; and, negatively, the elimination of whatever is superfluous or jarring.
8. *Croce* (9) : indivisibility.
9. *Art educators* (42) : unity as a summative resultant attribute of all the principles of art.

*Suggested psychological explanations.* From a survey of all the allusions to unity (formal and expressive) in the works of some thirty-five modern art theorists, it was found that only a few revealed any evidence of an attempt to found their diverse descriptions of unity on any sort of psychological basis. Of these, none was based upon experimental evidence. Typical of the psychological descriptions or explanations offered are the following:

1. *Hirn's pleasure-pain hypothesis* (18).
2. The organic state theories of Munsterberg (27), Puffer (34), and Ogden, Richards, and Wood (30, 38, 44), all of whom seek the basis of aesthetic pleasure in harmonious physiological states.
3. Related to these organic state theories is Read's statement of the impossibility of explaining pleasure derived from formal elements until we have laid bare the physiology of instinctive responses, explained the part played by pattern in the stimulation of visual acuteness, the relation of rhythm to bodily movements, Read (36).
4. *Raymond* (35) relates "apprehensible unity" to its effects upon the motive organs of sensation in the ear or eye, or upon the emotive sources of imagination in the mind.
5. *Fry* (12), *Mathias* (26), *Reid* (37), *Barnes* (2), and many others constantly refer to the psychologically attested fact of the impossibility of attending to a large number of discrete units at one time.
6. *Chandler* (6) maintains that perception is facilitated by presenting the object in a favorable light, "since some aspects are more informing than others". To gain the end of "clarity" the artist presents things in their most significant aspects. Chandler considers clarity, however, only one of various values which the artist may seek.
7. *Langfeld* (24, p. 33 ff.) arrives at essentially the same facilitation basis. "There are some laws, however, which are founded upon such fundamental facts of the human mind that they can be considered . . . firmly established. For example, it does seem from what we know of perception that its chief characteristic is unification. It is through this unification of the object, this relation of the parts one to another, that it is grasped by the mind. There is in this an economy of effort which is essential to mental development. Therefore, it is reasonable to expect that an arrangement of the elements of an object of contemplation which aids this unification will meet the mind better and be more acceptable than an arrangement which does not do so. Unity can, therefore, be considered a firmly established principle of beauty."

The psychological basis most often accepted by the aestheticians, then, seems to be rooted in the idea of some sort of direct

relationship between facilitation (sheer ease) of perception and pleasure in that perception. An attempt was made in this study (Procedure II) to investigate this postulate. Apart from this theory which—if it should prove to be in any way explanatory could only account for the visual, formal factor in the aesthetic experience, unity in its most restricted sense—the most adequate view of the problem appears to be that of Parker (31). By his concept of "organic unity", he means that every element in a work of art is necessary to its value, "that it contains no elements that are not thus necessary, and that all that are needful are there. . . Moreover the value of the work as a whole depends upon the reciprocal relations of its elements: each needs, responds to, demands every other element. . . In short, the meaning of the whole is not something additional to the elements of the work of art, but their coöperative deed".

He too postulates a harmony between the unity of the exterior object and the psycho-physical personality of the observer. Many aestheticians other than Parker have reiterated the essential wholeness of the art experience. The aesthetic experience has always been felt to be integral, "embodying a total state of the mind", but the difficulty lies in finding a satisfactory explanation of the "how" of this totality.

*B. The gestalt approach to the problem.* The fact that aestheticians have been keenly aware of the *wholeness* of art experience, *i.e.*, the essential "indivisibility" and "self-containedness" of that experience as its most unique characteristic, and yet have for the most part avoided psychological interpretation of this experience leads to the possibility that psychological principles have been inadequate to supply explanatory concepts to the problem. Where analysis has been possible or desirable, psychological experimentation has contributed a considerable body of data which can be used as an important "substructure to aesthetic" (15). Where integration has been necessary (as it is in any consideration of the individuality of the aesthetic whole) the tenets of associationism have not been conducive to significant contributions because of the difficulty of articulating

the various results in any other than a synthetic way, which inevitably fails of reintegrating the elements.

For this reason it was felt that the viewpoint and findings of gestalt psychology in the field of visual perception might prove fruitful in suggesting approaches to the study of unification in works of art and the contemplator's grasp of that unity. The explanations of perception may be used as a convenient point of departure because they emphasize the organizing process which characterizes all creative art.

A gestalt, or configuration, is "any organized whole in which there is a reciprocal influence among the members and the whole, so that the totality contains more than a mere sum of what analysis would call its parts and their relations" (16, p. 311). This concept of "wholes" and "parts" is a primary one to gestaltists. One of their main tenets (which has long been intuitively understood by artists) is that the whole is never merely the sum of its parts since the parts, having been fused, make up a unitary organization which need not have any of the characteristics of its isolated parts. *Campbell* (5), who summarizes the gestalt experimental studies which bear most directly on art, points out that a work of art considered as a whole possesses a sort of "necessity" of part to part, of part to whole, and of whole to part which gives it the marks or creates the relationships universally assigned to a beautiful work of art, *i.e.*, balance and unity.

*Allesch*<sup>2</sup> (1) says that grasping the essence of an aesthetic whole may be compared with becoming acquainted with a personality. He states that the interrelations and correspondences existing between the single traits and the whole give the work of art a certain character and thus determine the work of art and its "adequate contemplation". He also stresses the point that the single parts (which may be approached by analysis) con-

<sup>2</sup> Allesch is the only writer who has directly applied gestalt principles to an aesthetic. His articles, however, were written at a period when gestalt experimentation was in its infancy. Consequently, most of his statements are *a priori*, but they do bring out a valuable approach to many questions. His criteria of aesthetic value, based upon gestalt, are: intentional unity, compactness (the art of omission, stressing the immediacy of the experience); intentional breadth; and impressiveness or intensity.

sidered *per se* do not show the characteristic of the whole in which they are imbedded. He concludes that the work of art most clearly exhibits the gestalt process (*gestaltung*).

The gestaltists have emphasized the fact that *all* of our visual world (not just that enclosed in a frame) "shape, size, color, orientation, localization, are constituted in a thoroughgoing mutual interdependence" (20). That sense data exist as ordered or formed and that it is as so ordered that they are given to us is one of the most significant contentions of gestalt psychology.

The artist does not select, out of an unformed mass, elements which he then synthesizes into a whole. Rather he finds already unified structures (5). His task is sometimes to *break down* these existing entities, sometimes to *strengthen* the given interdependence within a framework by a sensitive process of "stresses and slights" (25).

*The problem.* For the purposes of this investigation, *unity* is defined as: the intentional gathering to a focus of all the qualities (both formal and expressive, objective and subjective) within the work of art so that it may be experienced as a self-sufficient totality. The purpose of this study is to investigate some of the essential bases of unity in graphic art, psychologically stated as the question of whether or not, other things being equal, a stimulus-situation which has relatively great cohesive structure exerts any determining influence over the contemplator's immediate affective reaction. Involved in this problem are several subsidiary problems:

- (1) The relationship between the demands of visual perspicuity and pleasant hedonic tone.
- (2) The extent to which structural organization of sense data is operative *per se*.
- (3) The functioning of *Aufgabe* (the subject's orientation or mental set toward the perception) as a block or aid to the subject's apprehension of the unity inhering in the stimulus-situation.

*II. Experimental procedure. A. Preparation of stimulus materials.* In harmony with the gestalt method of approach which regards unified structurization as a characteristic only of the work of art conceived as an experiential totality and not of any isolated traits, it was considered undesirable to present over-

simplified or artificially abstracted forms to the observers in lieu of the experience of the totality. Past experimentation has been



1a



1b



1c



1d



1e



1f

FIG. 1. Types of stimulus material used. 1a. The bridge at Arles today (Courtesy Joseph Kastner and *Time*, Inc.). 1b. Bridge at Arles, by Van Gogh (Courtesy Museum of Modern Art, New York, and Rijksmuseum Kroller-Muller, Wassenaar, Holland). 1c. Photograph of Hoover birthplace, West Branch, Iowa. 1d. Wood, Birthplace of Herbert Hoover (Courtesy of Grant Wood). 1e. *Pere Juniet et sa Famille* (Photograph, from F. Roches). 1f. Rousseau, *Pere Juniet et sa Famille* (Courtesy Mme. Paul Guillaume, Paris).

criticized for the unwarranted assumption that the identity of any sensuous element is the same *within* a complex aesthetic whole as it is when abstracted *from* it, or prior to its absorption into the context of a work of art and *after* it. (Gilbert, 15.) Since the present study is an investigation of *unity*, it seemed inadvisable to destroy that unity in order to observe it.

Consequently, at the risk of less adequate laboratory controls, it was decided to present pairs of relatively well unified and less



FIG. 2a. Alma-Tadema, Blind Girl of Pompeii (Courtesy of Davis Press, Worcester, Mass.). Illustrating extreme instance of illusionism.



FIG. 2b. Marin, New York Telephone Building (Courtesy American Magazine of Art). Illustrative of extreme expressionism.

successfully unified stimulus objects in order to study possible differences in the perception of each by naïve observers. To meet the need for such contrasted material, a series of paintings was selected. Each painting was paired with a photograph which was either a studio set-up photograph attempting to simulate the artist's work or was taken on the actual scene of the artist's creative work. The selection of these particular pictures was somewhat dictated by the exigencies of the situation since it was necessary to use only those for which there could be found a photograph adequately representing the original sense data of nature prior to their restructurization by an artist to meet his

expressive needs. Such material is naturally limited. The final selection was made, out of over fifty such pairs, by the experimenter with the advice of a group of art psychologists, taking into account such considerations as variations in the degree to which the painting departs from the natural stimulus situation and variations in style and personality expression. The paintings used range from an extreme of illusionism, Alma-Tadema's *Blind Girl of Pompeii*, to an extreme of expressionism, John Marin's *New York Telephone Building* (Fig. 2). Because of this wide variation in quality and type of pictures used in the study and since the "gestaltung" of a work of art, being the product of a creative personality, is relevant to that work of art



FIG. 3a. Benton, Speeding Train.  
(Courtesy Thomas Benton.)



FIG. 3b. W. L. Greene, Twentieth  
Century Limited. (Courtesy  
New York Central Lines.)

only, no attempt was made to give any sort of a relative "ranking" to the paintings. Throughout the experiment, each was judged only in relation to its paired photograph.

The finally selected paired pictures were made up into achromatic slides, photometrically equated for 500 watt projection illumination. In each case the photograph was so printed as to approximate the dark and light values of its concomitant painting. The slides were arranged in two series, IA and IB,<sup>4</sup> with the order of presentation of P and Ph (pictures and photographs) reversed in order to cancel out any possible constant space error in the successive presentation. Within each series

<sup>4</sup> Complete data on all slides is on file in the University of Iowa Library.  
(Thesis by K. Kellett.)

the order of presentation of P's and Ph's was arranged haphazardly to avoid expectation on the part of observers. As a further check on expectation the picture paired with Benton's *Speeding Train* was a naturalistic painting rather than a photograph (Figs. 3a, 3b). This was placed first in each series so that the subjects might not expect a series of all P-Ph pairs. Two other pairs of this type were also used.

*B. Objective appraisal of the stimulus pictures.* Despite the fact that inter-pair comparisons were impossible, it was necessary to have some sort of objective evaluation of the structural qualities of each painting as compared with its concomitant photograph. For this purpose the materials were presented to five art psychologists and five psychologists for relative evaluations.<sup>5</sup> The integrative factors were critically examined in two seminar discussions. As a means of review and further instruction, the following explanation was given to each member of the judging group two days before the scoring was done:

*Purpose of this procedure:* To obtain an objective rating of the stimulus materials used in this experiment on the basis of certain gestalt integrative factors more or less arbitrarily selected.

*Procedure:* On the rating sheet you are asked to check which of each of the pairs of stimulus objects to be presented better embodies each of the factors listed (in your judgment). The rating is purely relative (*i.e.*, picture 1 as compared with picture 2, not picture 1 as compared with some absolute standard which you set up). If, however, you feel that neither picture embodies one of the factors, leave that space blank; if you feel that each embodies it equally, check each. If you do not understand the criteria for judgment, you are at liberty to ask the experimenter.

*Explanation:* In order to facilitate your judgments, you are asked to read the following brief explanations of each factor, before the seminar meets.

A "gestalt", in the broadest sense of the term, is "any segregated unit". Accepting the stimuli as gestalts, having more or less organization, your problem is to judge, in the light of integrative factors making for a more articulated, rhythmic type of order—which is the better gestalt. (N.B., please judge phenomenologically.)

*Considerations in evaluation of the stimulus objects.*

1. *Prägnanz*.—"Compactness or condensation"; precision.<sup>6</sup>
  - a. Which is more compactly structurized, omitting everything superfluous to the immediate experience?
  - b. Which has more regularity, subjective simplicity, symmetry?

<sup>5</sup> Complete data is on file in the University Library.

<sup>6</sup> All definitions from *Koffka* (20) and *Hartmann* (16).

2. *Whole-part relationships.*—(Cf. seminar report on Wheeler's organismic laws applied to works of art.)
  - a. Which better exhibits reciprocal relations among all its elements—line, color, expressiveness, etc.—each part needing and responding to the demands of every other element in the totality?
  - b. Which do you feel is the more complete experience?
  - c. In which do you feel that the whole better conditions the activities of all of its parts?
3. *Closure.*—“Closed areas seem to be self-sustaining, stable organizations and therefore are more readily produced than unclosed.” Even where there are gaps left by objective experience of the artist, there is a marked tendency to fill them in. Not all closures are equally good.
  - a. Is there distortion to bring about a closure?
  - b. Are there pervading lines and forms tending to closure?
  - c. Is there a sense of equilibrium leading to a closure—a resolution of tensions which accompany closure?
  - d. Are there turned planes, blocked areas, heightened textures, or any other devices for effecting a more satisfactory closure?
4. *Good shape.*—(This is a disputed factor due to the manifest difficulty of deciding what is a ‘good’ shape under varying stimulus conditions.)
  - a. Which seems to have more stable, i.e., simple and unitary, shapes?
5. *Good continuation.*—(Allied to good shape.) “Any line will tend to proceed in its own natural way, “a circle as a circle, an ellipse as an ellipse, a straight line as a straight line”, etc.
  - a. Which makes better use of this tendency for a line to continue in the most stable direction?
6. *Configuration.*—“As a unit in space, a configuration is a balanced system of structural energy, exhibiting a unique form of its own.” Figure cannot be considered except in its relation to ground and vs. Energy systems always seek stability.
  - a. Which seems to you a stronger figure ground experience?
7. *Visual grouping by similarity.*—Units and sub-units are formed, not by virtue of the proximity of parts but because of similarities.
  - a. Is there conscious echoing of motifs, forms, planes, lines, textures, etc., pulling together the totality by the effects of similarity?
  - b. Are there proportionate groupings?

*C. Technique and general experimental conditions.* In order to investigate the function of unity in the observer's experience of the pairs of relatively well and poorly structurized materials, it was necessary to subject the pictures to reduced external organizing forces. The most easily controlled of these forces operative on perceptual phenomena are time and illumination intensity. The underlying gestalt hypothesis in such a method of “functional analysis” (Koffka), consisting of limiting the stimulus instead of changing the phenomenal data, is that integrative factors tend to facilitate perception; disintegrative factors to

disrupt it. An allied postulate which seemed to have a rather direct bearing on the problem of unification of complex perceptual experience is that the stronger the forces which held a thing together, the more resistant it will be to reduced external forces of organization. The well-known gestalt experiments with simple figure-ground configuration have fairly well established the truth of the hypothesis for simple geometric perceptual material. This investigation sought to discover whether the "universal laws" of structurization hold for complex objects such as works of art. Using these gestalt findings, then, only as a point of departure, it was felt that perhaps—provided the external conditions could be satisfactorily reduced and controlled—the better unified of each pair of P's and Ph's prepared for the investigation might be strong enough to force itself upon at least the immediate hedonic reaction of the naïve observer.

Preliminary experimentation utilizing a combination of reduced time and reduced illumination intensity proved that the reduction of illumination intensity was subject to the entrance of too many extraneous variables. For instance, the relative resistance of the paired slides seemed to be more a function of sheer strength of dark and light contrast or definition of contours rather than of any inherent structural or expressive cohesiveness.

Consequently a straight tachistoscopic technique was adopted using a Bausch and Lomb projector (500 watt lamp) and a modification of the Whipple portable tachistoscope (41, p. 293), consisting of a silent studio photographic shutter with a 3" by 3" opening. This was set up in front of the projecting lens to interrupt the beam of light directed on the screen and thus control the time of exposure. Two exposure times were used, one a very short time exposure of .24 seconds given for the purpose of limiting the associational component and giving an opportunity for the strength of structure to operate. *Külpe* (23) found that exposures as short as three seconds still admitted the associational components. Brighouse (4) using an exposure time of .26 seconds found that there was an immediate hedonic response for even so short an exposure as this. It was not necessary nor possible to eliminate all the factors other than unity

(formal and expressive) entering into the experience for the purpose of this experiment. However, it was desired to compare the immediate affective reaction to the paired stimuli to a more studied response to the same stimuli. For this reason a second exposure time was used, 30 seconds in duration. For Part II the .24 exposure was used to test facilitation (*cf.* Procedures, below). The pressure and immediate release of the pneumatic release on the portable tachistoscope was found to give a fairly constant .24 second exposure when timed with the Whipple disc tachistoscope, electrically set at .24 second.

The physical conditions for the presentations were kept as nearly uniform as possible. All experimental sittings took place from eight to ten A.M., or from twelve to two P.M. The groups of subjects, averaging about twenty in each, were seated in darkened lecture rooms. They were so arranged that the white screen upon which the pictures were projected was within the central vision of every subject. Sufficient illumination was allowed between exposures<sup>7</sup> so that the subjects might check their responses, but it was kept low enough so that there was no need for a darkness adaptation period.

*D. Procedure I—Hedonic response; Procedure II—Facilitation of perception.* These procedures were for the purpose of investigating the subjects' hedonic responses to the stimulus pictures, the possibility of facilitation of perception on the part of the artist, and the relation between the two.<sup>8</sup>

*General instructions.* Uniform instructions, to insure the proper attitude for the experimental situation, were given to all subjects: \*

*a. For Part I—Hedonic response.* "Perhaps you have taken art tests before, tests in which your capacity was scored. Now you have the opportunity to test someone else, the artists of the pictures which you will see on the screen. You will be asked to make some choices. In making them, try not to be influenced by what you think your art teachers or the experimenters might like you to prefer or by what you think you should prefer. All we wish to find out is which one of each of the pairs of pictures shown you yourself honestly like the better.

<sup>7</sup> By raising the cover of the lamp housing, permitting light to reflect from ceiling.

<sup>8</sup> Recording forms are on file at the University of Iowa. (Thesis by K. Kellett.)

\* Adapted to the comprehension of high school students.

We will now work out together a trial run of the first experiment. You will see, for a very short time each, a pair of pictures which may look at first sight a good deal alike. We shall call them "first picture" and "second picture". As soon as you have seen them, decide which one you liked the better and place an X in the square opposite your choice on the grid. (Demonstrate checking procedure, prefixation area, and ready signals.)

Are you ready for the first picture? Now.

Are you ready for the second picture? Now.

Record your choice under exposure A.

Now you will have a chance to see the pictures again for a longer time so that you may compare them. You are at liberty to change your mind about your first choice or to stick to it, just as you feel. Are there any questions about the procedure? If not, we are ready to go on. You will see several pairs of pictures. Always make a choice even though you may not, in some cases, feel that you like either picture very well." (At the end of the whole series the subjects were asked to give reasons for change of mind between exposures.)

(Same ready signals and recording as above.)

b. *For Part II—Facilitation.* "In this experiment you will see, again for a very short time (demonstrate) pairs of pictures which we will call "Picture A" and "Picture B". Then you will be shown a slide containing four pictures in the same position as the grid on your record blank (demonstrate). One of the four pictures will be the same as picture A or picture B which you have just seen. If you recognize it place an X in the square corresponding to its position on your grid. (Trial run and questions.) (See Appendix of thesis at Iowa Library for record blanks and master lists of materials presented in Parts I and II.)

c. *Subjects. For Parts I and II.* Records were secured for a total of 430 boys and girls of high school age. Of this number 114 were classed as "untrained" (U group) and 318 were classed as "trained" (T group) on the basis of having had two or more semesters of high school art training (see Appendix for type of training).

E. *Procedure III—Influence of attitude on perception.* A preliminary qualitative analysis of the high school subjects' recorded reasons for their changes in preference from exposure A to exposure B revealed a preponderance of purely subjective factors influencing the total perception. As a result of this survey it was thought necessary to investigate further the effect of attitudes ("i.e., forces having their origin in the ego of the observer", Koffka) on the perception of the physically given data. The technique used was purely exploratory and is not to be considered as a finished experiment. Five art psychologists and two psychologists (one of whom was a gestaltist; the other, an educational psychologist) were used as observers. Three of the art psychologists were already familiar with the pictures used.

*A. Technique.* Four stages of illumination intensity were worked out, using the method of constant stimuli, for each of four pairs of slides used in *Procedure I* above. The stages for each pair were equated according to the photometric ratios previously established, so that they were objectively equal in light and dark intensity. A Variac auto-transformer,<sup>9</sup> cut into the main projection circuit, was used to control the equated stages.

The first stage was liminal for the experimenter and one observer; the next one (or two, depending upon the complexity of the pictures) gave experiences successively more full; and the highest stage was at the point of optimal illumination for each picture. Table I gives the pictures used, the order of presentation, and the illumination intensity for each stage.

TABLE I. *Stages of illumination (watts)*

Pictures	1	2	3	Optimal
IA5-P	14	15	20	90
IA9-P	11	14	20	87
IA1-Ph	11	13	18	65
IA5-Ph	12	13	21	80
IA1-P	13	15	18	80
IA9-Ph	12	15	22	87

*B. Instructions to observers.* The observers were instructed that the experiment was being conducted to investigate the gestalt assumption that the factor of intensity has less effect upon a good configuration than upon a poor one. This instruction was given to insure objectivity of report and to guard against the operation of suggestion concerning the true motive of the exploratory technique. The observers were asked to write full descriptive accounts of their experience after each presentation of a stage. They also recorded the point at which they could recognize the picture as being either assuredly familiar or unfamiliar. This was done for the purpose of discovering whether those who were most familiar with the materials tended to "fill in" their perceptions at the lower stages. They were asked to comment freely on differences in the *completeness* of their experience at each level.

<sup>9</sup> General Radio Co., Cambridge, Mass., Type 200-C, 5 amperes capacity.

. . . "Your report should include, in so far as possible, your entire experience of what you see on the screen even though it may appear, phenomenologically, as nothing but a light grey blob on a dark grey blur."

It was necessary to allow sufficient time for adaptation before each exposure.

*III. Results and Discussion. A. Relative evaluation of stimulus materials on the basis of gestalt integrative factors.* The results summarized in Table II are not in any sense to be con-

TABLE II. Comparative evaluation\* of integrative factors in P's and Ph's

Picture Pairs	Ratios		Ratios	
	P	Ph	Art Psychol.	Psychol.
IT0	.762	.238	.106	.894
IA1	.950	.050		
IA2	.825	.175	.500	.500
IA3	.962	.038		1.000
IA4	.762	.238	.660	.333
IA5	.962	.038	.579	.421
IA6	.825	.175		1.000
IA7	.650	.350	.108	.892
IA8	.950	.050		1.000
IA9	.707	.293	.200	.800
IB1	.737	.263	.112	.888
IB2	.812	.188	.400	.600
IB3	.812	.188	.067	.933
IB4	.675	.325	.308	.692
Mean ratios (P's to Ph's)	.814	.183		

sidered an absolute measure of the "amount" of unity inherent in each P and Ph in the series. They are qualitative and relative only. Gestalt experiments (5), (16), and (17) have shown that all perceptions are configurated, organized. Consequently organization cannot be interpreted as an exclusive characteristic of aesthetic objects. However, assuming that sense data in any perceptual experience are more than clusters of connected elements, and judging the set of stimulus material on the basis of integrative factors which are possible in any perception, the results (in-so-far as they may be considered objective) do indicate the relative superiority of each P over its paired Ph in meeting the demands of visual perspicuity.

That the relative judgments are significant only with reference to external, formal unity and not to expressive unity is seen by

a brief study of those paintings having the lowest total ratios for the various factors. For example, Marin's *Telephone Building* (IB4) (Fig. 26), derives its unity not so much from obvious formal "tidiness" as from the conditioning high level of emotional intensity of the artist. The same interpretation is possible for Van Gogh's *Restaurant* (IB1). Mursell (28) considers integration through the function of emotional congruence the natural dynamic point of unity.

Alma-Tadema's *Blind Girl of Pompeii* (IA9), the most naturalistic of the paintings, also received the largest number of split checks.<sup>10</sup> These results, which are not significant in and of themselves, will be further discussed in the light of other findings.

*B. Affective reaction to pictures and photographs.* The results for *Procedure II*, the reactions of high school subjects to the paired paintings and photographs, are summarized in Table III.

The relations between the P preference and Ph preference were found by computing the total preference for each P and Ph under both exposure times. Table III gives the per cent which the P and Ph totals are of the sum of all responses under each set of conditions, *i.e.*, immediate affective response (A) and more considered response (B).

Rather wide differences are to be noted between the preference ratios for the various pictures. This would naturally be expected because of the differences in objective value of the pictures in the series. Since these differences exist, comparisons using the mean ratios of P and Ph choice are of little value for they express only an average of a sum of differences. This necessitates, throughout the discussion of the results, a study of the individual paintings, each one being logically comparable only to its own paired photograph, representing fairly closely the natural stimulus situation for that particular creative experience. For example, one may not say that because Rousseau's *Pere Juniet* has a higher preference ratio than Tintoretto's *Cain and*

<sup>10</sup> The observers were instructed to give a check to each picture in cases where they could make no positive decision. In tabulating the results these equivocal ratings were divided equally between the P and Ph scores.

*Abel*, it necessarily follows that Rousseau's painting has more unity than Tintoretto's.

Table III shows fairly conclusively that in this particular series of pictures the subjects, on the whole, showed a slight

TABLE III. *Affective reactions to P's and Ph's*

Pairs	E	U Group		T Group		TU Group	
		P	PH	P	PH	P	PH
IT0	{ A	140	860	287	713	249	751
	{ B	465	535	227	773	291	709
IA1	{ A	690	310	728	213	828	172
	{ B	824	176	298	702	848	154
IA2	{ A	400	600	748	252	441	559
	{ B	370	673	966	034	185	815
IA3	{ A	666	334	654	346	659	341
	{ B	526	474	226	774	373	627
IA4	{ A	246	754	453	547	387	613
	{ B	228	772	416	584	359	643
IA5	{ A	254	315	453	547	397	603
	{ B	746	685	456	544	417	583
IA6	{ A	324	676	398	602	379	621
	{ B	298	02	439	561	402	598
IA7	{ A	298	102	262	738	272	728
	{ B	420	680	781	219	686	314
IA8	{ A	750	666	699	301	728	272
	{ B	250	334	626	374	637	363
IA9	{ A	710	290	755	245	743	257
	{ B	728	272	828	172	800	200
IB1	{ A	290	710	631	369	450	550
	{ B	200	800	557	443	364	636
IB2	{ A	466	534	561	439	526	474
	{ B	517	483	627	372	587	413
IB3	{ A	447	553	417	582	405	594
	{ B	422	578	592	407	425	574
IB4	{ A			266	733	266	733
	{ B			327	673	327	673
A B A+B }		Mean preference ratios				{ 480 478 479	586 521 556

preference for photographs over paintings when the mean ratios are considered; a rather decided preference for them when the ratios are individually examined. Table IV with the numerical relationships deleted, expresses this fact schematically. It will be seen that only four pictures—the Wood (*Birthplace of Hoover*), the Rousseau, the Vermeer, and the Alma-Tadema—were preferred over their paired Ph's by both groups. Of these,

only two—the Vermeer and the Alma-Tadema—were preferred consistently (both exposures, both groups). It may be significant to note that since in both of these paintings the subject, a girl, is "prettier" than the one in the paired photograph, the high school subjects preferred them. That this superficial reason rather than anything inherent in the structure of the paintings motivated their choices in these cases, is further substantiated by their verbal reports (*cf.* results, part D) (p. 44).

TABLE IV. *Paintings which were preferred*  
(From a total of 14 pairs)

U Group Exposure		T Group Exposure		TU Group Exposure	
A	B	A	B	A	B
IA1	IA1+	IA1	—	IA1	IA1+
IA3	IA3—	IA2	IA2+	IA2	IA2—
IA8	IA8—	IA3	—	IA3	—
IA9	IA9+	IA7+		IA7+	
		IA8	IA8—	IA8	IA8—
		IA9	IA9+	IA9	IA9+
		IB1	IB1—	IB2	IB2+
		IB2+	IB2		
			IB2+		

The plus or minus signs following the paintings preferred in Exposure B (Table IV.) indicate respectively a rise or fall in the preference ratio for the particular painting over its preference ratio in Exposure A (*cf.* ratios in Table II). For example, Rousseau's painting was preferred by 66.6 per cent of the untrained observers when it was seen for a very short time. When it was considered for a longer time, it was preferred by only 52.6 per cent of the untrained observers. This falling off is denoted by a minus sign following the IA3.

An examination of Tables II and III also indicates a negligible difference between the trained and untrained group in the preferences expressed. Comparing the considered choices (Exposure B) of both groups, the trained subjects expressed a preference for only two more paintings than did the untrained group. These pictures were the Tintoretto and the Van Gogh *Restaurant*. On reconsideration (B) of the Benton and the Rousseau, they changed their preference to the paired material (*cf.* recorded reasons for changes under Results, part D).

The slight differences found between the groups tend to the conclusion that for the purposes of this experiment, any arbitrary division of the subjects into "trained" and "untrained" may be of doubtful value. In the first place their training, thorough academic work in "units" of design principles and color seems to have little bearing, as evidenced by these results, on the immediate, uncritical, unanalytical reaction to the picture totality. In the second place, even assuming that there is a slight distinction between the two groups, caution must be exercised in the definition of "trained" and "untrained". If, however, the immediate affective preferences of a so-called "trained" group (on the basis of two or more semesters of high school art) are not interpreted as directly relevant to the more highly sensitized reactions of the assured creative artist, then the distinction is valid. Insofar as preference for these paintings over these photographs may be considered indicative of sensitivity to organizing factors within a work of art, the trained students showed little advantage over the untrained. The cases in which they did, on the second exposure, shift definitely over in favor of the P will be discussed in the light of their stated reasons.

A qualitative comparison of the results (Table I) of the relative evaluation of the P's and Ph's by the art psychologists and the psychologists with the preferences expressed following exposure B (Table II) show no positive relationship existing between the "expert" judgments on gestalt factors and the considered responses of the naïve subjects. The relationship may be schematically expressed as:

$$U \frac{4-9}{13} \qquad T \frac{7-6}{13}$$

where U is the untrained group, T the trained; 13 is the total number of pictures for which there are responses from both U and T groups; 4 and 7 express a slight relationship between the expert judgments and the naïve affective preferences; -9 and -6 express a negative relationship between the same two values. Here, again, there is little difference between the U and T groups.

Table V summarizes the relationships between the total number of responses for each picture which remained the same from the short time to the longer time exposure and the total number of responses in which there was a shift in preference in favor of either the P's or the Ph's.

TABLE V. *Preference stability and changes incident to the longer exposure time*  
Ratios of Preference Stability to Preference Change for TU Group

Pictures	A to B Stable	A to B Ph to P	A to B P to Ph
IT0	.798	.109	.093
IA1	.832	.096	.065
IA2	.755	.119	.126
IA3	.737	.093	.168
IA4	.822	.083	.095
IA5	.777	.124	.099
IA6	.819	.105	.076
IA7	.839	.105	.056
IA8	.835	.056	.109
IA9	.795	.137	.065
IB1	.613	.153	.234
IB2	.720	.150	.130
IB3	.580	.220	.200
IB4	.558	.101	.341

It is noted that the ratios for stability are much higher than those for change. This may be interpreted as a result of inertia, of suggestion implied in the instructions (although they were carefully worded to avoid possible suggestion that change in choice might be the right or wrong thing for the subject to do), as evidence for the immediacy of the aesthetic experience and preference whether that preference is for the objectively better structured of two stimuli or not. This last interpretation supports Brighouse's findings (4) on the immediacy of response.

The differences between the ratios of change from exposure A to exposure B in favor of one or the other of each pair is so slight that no conclusions may be drawn from them regarding the operation of visual unity as a significant factor in the choice. If, for example, the ratios for change in preference in favor of the Ph had been significantly greater than that for the converse change, it might tend to indicate the functioning of strength of structure as a determining factor in the immediate perception which was overcome on second consideration by subjective

factors such as search for subject matter familiar to the experience of the observer.

*C. Facilitation of perception.* The results for comparative ease of perception of four paired P's and Ph's are summarized in Table VI.

The ratios express the relation between recognized and non-recognized P's and Ph's (*cf. Procedure II*). A relative measure of facilitation of perception can be attained by a comparison of

TABLE VI. *Facilitation of perception*

		Ratios	
Pictures		Rec.	N. Rec.
Rousseau (IA3)	P	.825	.147
	Ph	.511	.488
Marin (IB4)	P	.848	.152
	Ph	.866	.134
Drawbridge (I10)	P	.474	.526
	Ph	.196	.804
Drawbridge (I11)	P	.720	.280
	Ph	.625	.375

the larger per cent of recognition with the smaller for any given P-Ph pair, the P's having been presented to one group of subjects for recognition, the Ph's to another.

Rousseau's painting and the Van Gogh *Drawbridge* (I1) under the conditions of this experiment are the only two P's which clearly seem more organized for perception than the paired Ph's. However, the tentative and inconclusive results are to be considered as merely a suggestion for further and much more extensive study of the question of facilitation of perception because of the limited number of groups, the few pictures used, and the inadequate control of the experimental situation.

*D. The influence of attitude on the perception of unity.* A brief discussion of some of the qualitative results which came out of a study of the written reports of the high school subjects may serve to clarify some points in the above quantitative results. A survey of these reports shows first of all that the subjects had definite mental sets toward the pictures presented which in many cases seemed to predetermine their choices.

Typical statements which illustrate this are:

"At first the picture looked interesting and very pretty but the second time the other one looked more real and natural—more like the real thing" (Untrained subject; IA3, changed to Ph).

"Because the artist cannot make things as beautiful as actual things no matter how he tries" (Untrained subject; IA5, changed to Ph).

"The getting away from photographic likeness in some of them appealed to me because I am interested in the modern style of work that gives an interesting point to its pictures" (Trained).

"Some of the pictures were photographs, not, in my opinion, art, but some were better than the drawings. In most cases the drawings stood out much better than the photographs" (Trained).

"Some were sketches, which I like better. An example was the train picture (IT0). I preferred the latter (P) because it was a more original idea and drawing, while the former was more commercialized" (Trained).

The great number of reports similar to the above indicate that the subjects, trained and untrained alike, evaluated the pictures, not by themselves alone but as members of a *class* of pictures. *Koffka* (20) has pointed out that the concept of a schema (in this instance made up of every work of art which each observer has experienced) is a psychological reality, determining the actually appearing individual object. The quality of the immediately perceived painting, then, depends upon the degree to which it fits into each person's own picture schema. This is a probable explanation of the rejection by so many of the observers of non-realistic paintings like Marin's *Telephone Building*. Epithets such as "absurd", "funny", "queer", and "awful" were used to describe it. Such pictures have no place in the picture schema of relatively unsophisticated persons and are consequently rejected regardless of fine formal value inhering in them. A further investigation of the problem of the formation and change of picture schemas, involving thorough art case histories of the individuals would be valuable in determining the internal conditions to the art apprehension.

Another important observation is that there is no one-to-one relationship between the quality of the verbal reports and the aesthetic preference of the subjects. For example, a great many subjects, particularly those having had five or more semesters of art training gave intelligible and intelligent reasons, based upon an evident familiarity with art principles of form. When, how-

ever, their reports were checked against their preferences, no direct relationship was to be found between the two. For example, subjects who referred to "composition", "softness of tone", "line, rhythm, and beauty", "arrangement and values", "real form and beauty", "distribution of light and dark and better opportunity to appreciate detail" as reasons for their preference changes (exposure A to B) respectively changed to: P (1 case), Ph (2 cases); P (1 case), Ph (1 case); Ph (2 cases), Ph (2 cases), P (3 cases), Ph (1 case); P (2 cases). These are typical of the general lack of relationship between verbalization and aesthetic choice, tending to indicate that verbalization is possible where understanding of the emotional force of the work of art formally expressed, is lacking.

The same lack of one-to-one relationship is not apparent in those reports where reasons for change of preference were based upon a search for realistic subject-matter relevant to the subjects' interests, such comments as: "more real", "wrestlers better fighters", "looks more like a cheerful and respectable neighborhood", etc. In these cases the preference change was almost universally to the photograph. An outstanding instance of this was the Rousseau painting. It seemed to attract the immediate interest but failed to hold it (*cf.* Table III, IA3). In the light of the comments on it (a typical one is: "At first it (P) seemed neat and clear and interesting; I liked it. When I saw it for a longer time, however, the people and animals seemed stiff and cold and unnatural. I like realistic drawing"), it seems fairly evident that, in this case at least, preoccupations with subject-matter or with the picture as a substitute object for reality, do serve to block the adequate understanding of factors going to make up the totality of experience of the picture.

In the case of Alma-Tadema's painting (IA9) (*cf.* Results, Part B) the preference change to the painting, according to the written reports, was because of this same substitute object concept of a painting. A typical reason is: "The girl (in P) looks more like a pretty person one would like to see in real life."

\* The high ratio of stability of choice for most of the pictures (Table V) tends to show the relative strength and persistence of

predetermined mental sets although no definite conclusion regarding this idea may be ventured because of the operation of other factors.

The evidence from the verbal reports seems to indicate that we cannot arrive at a complete understanding of the appreciator-work of art relationship without considering the problem of attitudes much more thoroughly. Gestalt experiments in the field of visual perception have demonstrated that forces starting in the "ego" can actually take effect in the field and determine its articulation. Much more study needs to be done on the effect of mental set on the observer's perception of well or poorly unified material before any conclusions may be attempted.

A qualitative study of the reports of the group of art psychologists and psychologists gives further evidence of the primacy of "internal" organizing forces over "external". These observers, trained in psychological report, were told to give *objective* reports, limited to purely visual phenomena. The fact that, even when the report is thus impersonalized and limited, the observer will, nevertheless, tend to see what he is mentally set to perceive is evidenced by the following excerpts from the visual reports on two stages (2 and 4) for the Cezanne *Still Life* and the final stage (4) of the Alma-Tadema, *Blind Girl of Pompeii*. The notation preceding each quoted report means: "AP"—Art-psychologist; "P"—psychologist; "F"—familiar with the picture before the experiment; "U"—unfamiliar with it.

#### Stage 2 of Cezanne *Still Life*

AP(U) "Conscious of no definite pattern. Did distinguish darker central portion broken by slightly lighter portions. Had a sense of closure of light within a dark mass."

AP(U) "At first only perception of mottled effect in center of screen. Then portions of a square of lighter dark. Tendency to fill in upper right hand corner of square which was lacking. Three brighter spots of light of various sizes, with search located other portions not so bright but brighter than background. Tendency to wish to join them in a pattern, at first a triangle. . ."

AP(F) "No definite content but guess from form it is one of the still-life pair. Tendency to fill in form of dish from what I guess it to be. Darker and lighter contrasts but no sharp contours. Only right hand side seems to have any form, neither pleasing nor displeasing."

"Light and dark doesn't seem balanced, with reference to imagined frame, but it doesn't affect the hedonic tone. Slight plane differentiation; the light almost detaches itself from the dark ground."

P(U) "First noticeable object was white patch extending from upper right to lower left. At first undifferentiated, later breaking up into smaller rounded patches of light on a dark blue ground. Block phenomenon of 1. not as noticeable, except during adaptation to dark. Patch finally appeared like flowers."

AP(F) "Vague forms concentrated in upper right sector. Resemblance to giant toad stool. Gradually wavered in distinctness until later on in the period the remaining portion of the rectangular area became visible, but with no great clarity. The light values in upper right were dominant throughout."

#### Stage 4 of the same picture

AP(U) "The organization shows up now in its more subtle relationships, and one is cognizant of the variations within the structure; although the main parts and rhythms were evident before and just as satisfactory in a two-dimensional direction. Depth is shown here for the first time and movement into the picture."

AP(U) "Feeling of enclosing dark enwrapped around central cohesive portion of dish of apples and cloth. Top half tone hard to relate to this effect—seems apart. Glassware also fails to 'belong' to the whole; as is decoration in upper corners. Three dimensional organization unsatisfactory but is all right two dimensionally."

AP(F) "The brightness referred to in 2 and 3 still bothers—seems to project a part of itself out of the reach of the rest of the picture. Definite figure-ground experience, contours marked, brightness differences. Repetition of circular shapes brings parts into relation with each other."

AP(F) "The planes at an angle to the picture plane complete the integration. There is a pull from the lower right throughout the whole picture—some so strong as to be lost in the backward movement. Texture and the increased illumination on the darkest areas stop the 'too strong movement' noted above. The tensions are balanced diagonally through the arrangement of the volumes."

P(U) "Different from 3 in that actual content is known but have not the same feeling of completeness about it. As picture was shown, realized that knife had been tablecloth. The figure here was not so discrete from ground. Was surprised to find how close to actuality I had come."

AP(F) "Well-distributed light and dark. Easy transition from part to part. Vase dominates the setting, all other objects appear well placed."

#### Stage 4 of IA9—Alma-Tadema, *Blind Girl of Pompeii*

AP(U) "Picture appears still worse structurally. Unbalanced in its elements, empty and meaningless. A shadow apparently placed to lead into the picture points to nothing."

AP(U) "Black of pillar now tends to fit with black background. Just begin sense of enclosing space which changes configuration; not grouping so well. Feeling flowers and container superfluous. On continued looking, just can't unify, that is, three dimensionally. Figure of girl fails to fit into shape."

AP(F) "Definite contours in middle half; they fuzz out at top and bottom, giving unpleasant feeling-tone. Empathic response to posture of figure. Figure seems divorced from background in places, and at bottom is undistinguishable from background. Great brightness contrast in middle half. Localized in planes. Line of light and dark pattern in the floor doesn't seem to do anything in particular."

AP(F) "There is a slight pull from lower-left to back-right, but the units are unrelated, isolated fragments. There is no feeling of totality, probably because it is not held together within the picture plane. There is no right-left pull to counteract the left-right movement. The strong dark and lights exhibit no closure."

P(U) "Startled by fact that living woman was shown. Thought at first that she was standing beside staircase, then recognized it as a statue of Winged Victory or the like. Could not distinguish object in left hand. Still have feeling of incompleteness. Have not filled in details as well as before. Background less differentiated than in last picture. First feeling of wholeness experienced. Floor becomes differentiated. As in the first picture, there is a feeling that picture has somehow disintegrated."

P(U) "Numerous details have been added in this exposure, the spots on the floor as well as the flowers on the colonades attract considerable attention in their importance. I imagine a staircase in the back of the room."

P(F) "Note for the first time that her left arm is supporting the outer rim of a larger ring or tray which fact seems to support the general balance of a figure within an area."

A comparison of the full reports for each picture in the series shows a wide difference in experiential unity even though the stimulus-situations were objectively identical, and even though the instructions precluded personal interpretation of the pictures.

*IV. Summary and Conclusions.* The purpose of the investigation was to study the functioning of unity in aesthetic perception. Using the general gestalt approach of limiting the stimulus-situation, a series of 14 paintings (P) judged superior to their paired photographs (Ph) which represented the original stimulus-situation in nature, were presented to a group of 430 high school students, "trained" and "untrained". Records were obtained of (a) their preference for the P's and Ph's on short and longer time viewing, (b) their subjective reasons for changing their original preferences following the longer exposure, and (c) the relative ease of perception of the paired material. Because of the evident significance of subjective factors in their reports an additional exploratory procedure studying the influence of mental sets on the objectively given stimulus-situation, was conducted, using as observers five trained art psychologists and two psychologists. Full reports were obtained of their experiences of paired paintings and photographs under three levels of reduced illumination intensity and one level of optimal illumination for each picture presented.

The manifest complexity of *unity* as defined in this study and the exploratory nature of the investigation preclude, at this point, very sharply defined conclusions. However, the results tabulated above tend to indicate that, at least for the particular stimulus pictures used and under the limiting conditions of the experiment, the following conclusions may be tentatively drawn:

1. Visual clarity of organization seems to be a relatively unimportant factor in the hedonic choice of the artistically unsophisticated observer. This leads to the possible interpretation that, contrary to the convictions of a great many aestheticians, objective unity is not a first determining factor in the pleasure derived from works of art, immediately apprehensible to all observers and pleasing because it facilitates perception, but rather it is higher in the scale of aesthetic values.
2. Mental set is strong enough to overcome any initial advantage which the better organized of two pictures may have in determining the hedonic choice of the artistically unsophisticated observer. The large ratio of stability of preference between the immediate affective response and the more considered response for these pictures also indicates the strength of attitude as a predetermining force in hedonic preference.
3. Training in discrete units of art principles may not be the educational equivalent to training in the adequate contemplation of a work of art as a totality, since the latter involves the complex problem of emotional integration of the individual.
4. A study of all aspects of unity must include more than an examination of the physically given stimulus. Within the limits of this experiment, unity seems not to be wholly inherent in the stimulus (as a direct result of the artist's recognized sensitivity to coherent integration) but rather in the stimulus-situation which includes articulating forces arising from the psycho-physical personality of the observer.

The problem points to further research on the questions of: (1) the formation of the art schema of the individual and the ways in which it may be operative in predetermining his mental set; (2) the determining factors in the past art experience of the observer which makes him more or less sensitive to works of art.

In short, research is needed on *experiential unity* in addition to *objective unity*.

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## VARIATION IN THE PERCEPTION OF AESTHETIC QUALITIES IN PAINTINGS<sup>1</sup>

by

MARGUERITE BIRCH CLAIR

*I. Introduction.* Formal qualities<sup>2</sup> have generally been recognized as basic factors in a work of art. To the average observer only a portion of these formal qualities are appreciated.<sup>3</sup> Only the very aesthetically sensitive individual approximates the maximum possibilities of the painting as experienced by its creator. This group is limited, probably including artists of comparable capacity, some aestheticians and critics, and a limited number of highly sensitive individuals in the general population, with or without formal training.

The objective of this study was to investigate the response-potential in high school students, both with and without training. To what degree could a typical high school junior or senior envisage the full perceptual potentialities placed in a painting by a first-rank creative artist? What proportion of the population would therefore be indicated as potential artist-prospects?

In order to attain the main objective it was necessary to

(a) Develop a technique for obtaining and recording verbalized responses that would be reasonably objective, yet flexible enough to allow for the greatest possible degree of response, and that would result in data that could be quantitatively and qualitatively analyzed.

<sup>1</sup> An investigation closely related to that of Brighouse (this MONOGRAPH), and of Kellett (this MONOGRAPH), and a part of the research program *Genetic Studies in Artistic Capacity* under direction of Dr. Norman C. Meier, sponsored by the Carnegie Foundation with funds of the Carnegie Corporation.

<sup>2</sup> Those, such as balance and rhythm in any effective functioning, that contribute toward an organically sound and effective organization (composition or design).

<sup>3</sup> Perceived in such a way that full enjoyment (completeness of experience) ensues.

(b) Develop a technique that would supplement the verbalized responses with objective results.

(c) Study the relation of the perception of aesthetic qualities to training.

*Aesthetic qualities* refer to all *means* used by the artist to achieve formal unity<sup>4</sup>—balance, rhythm, emphasis, proportion, sequence, and repetition (8). Aesthetic qualities are synonymous with organizing or structural qualities, considered as they function in the total form or organic whole. *Form*<sup>5</sup> is here considered as the visible structure which results from the interrelation of all the plastic elements—line, value, color, motif, volumes and space (1). It is assumed in this study that the perception of organizing or structural qualities contributes to the enhancement of aesthetic pleasure (3).

Because of its nature, this study is concerned with those perceptions which at any given moment function at the level of conscious experience to which the observer is capable of giving expression, supplemented by additional material not requiring verbalization. The form very probably determines the aesthetic attitude of the observer to a greater degree than he is capable of expressing verbally, but preliminary exploration indicated that under conditions of unlimited opportunities, it was possible that expressed observations would give a reasonably adequate estimate of those properties of form of which the average observer is aware.

Appreciation of a work of art is not entirely dependent on the perception of organic relationships adherent in the formal aspects of its construction (6). The associative qualities or content are perhaps of equal importance, but for the purposes of analysis it was considered advisable to concentrate on the *formal* aesthetic qualities perceived by the observers. The aesthetic qualities as

<sup>4</sup> That usually understood by the term *unity*, of which may be distinguished at times expressive unity, formal unity and other interests embracing form and content.

<sup>5</sup> The term is used for want of agreement upon a better term. It is recognized that the use herein assigned is not universal, and that other uses and meanings may tend to result in some confusion. "Aesthetic organization" may more adequately express the intended conception.—EDITOR.

defined are dependent upon what the artist has done with his materials rather than upon the imaginative and associative supplementation of the observer. The experiential correlate of the perception of form is subject to variation according to Pratt (6), but its stability is far greater than those experiences filled out with associated meanings: these come and go, whereas the enjoyment derived from the form is always potentially possible (6).

If a subject is able to see many relationships, it does not follow necessarily that he is more aware of the total structure than one who mentions only a few significant organizing factors. Neither can it be said that in recognizing the relationships in the composition the subject is having an aesthetic experience, for he may be failing to include all of those things which influence his attitude. If it is true, however, that the aesthetic experience is enriched by a conscious awareness of organization, then the degree to which people are aware of organization would be of distinct significance to art education. If a knowledge of organization is of value in enhancing the degree of appreciation, then it is important to discover how this knowledge functions at present levels of appreciation.

*II. Technique. Part I.* The following general procedure was adopted:

A reproduction of Renoir's "Le Moulin de la Galette" (Braun and Co. print, full color, 16" x 22") was placed in a room where it would be well lighted. The observers were shown the picture individually; their responses concerning the aesthetic qualities were recorded on the 'check-list'. This procedure was arrived at as follows:

*Preliminary experimentation.* Several full color full size prints<sup>6</sup> were shown to high school students in the University High School at Iowa City, and the high schools of Nashville, Tennessee, in an effort to discover the students' attitude toward them. The more abstract type of painting was eliminated; also pictures containing obvious distortions because in such cases subjects tended to become so preoccupied with the distortion as

<sup>6</sup> These were prints of excellent quality, passing as close approximations of the original paintings.



PLATE I



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to forget the organization. The older masters were avoided because prints of them, available in text-books, might be familiar to the students.

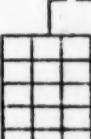
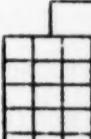
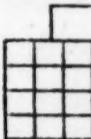
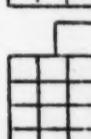
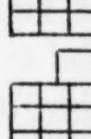
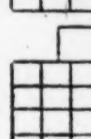
	<b>I. LINE ORGANIZATION</b>
	<ul style="list-style-type: none"> <li>1. repetition</li> <li>2. sequence</li> <li>3. linear rhythms</li> <li>4. line tension</li> <li>5. emotional effect of line</li> </ul>
	<b>II. VALUE ORGANIZATION</b>
	<ul style="list-style-type: none"> <li>1. variation in size of areas</li> <li>2. contrast</li> <li>3. grouping</li> <li>4. balance of dark and light</li> <li>5. emotional effect of value arrangement</li> </ul>
	<b>III. COLOR ORGANIZATION</b>
	<ul style="list-style-type: none"> <li>1. repetition</li> <li>2. sequence</li> <li>3. grouping</li> <li>4. variation in size of areas</li> <li>5. variation in intensity of color</li> <li>6. variation in hue</li> <li>7. contrast</li> <li>8. balance</li> <li>9. colors used to give movement</li> <li>10. tonality</li> <li>11. emotional quality of color</li> </ul>
	<b>IV. MOTIF ORGANIZATION</b>
	<ul style="list-style-type: none"> <li>1. repetition of shapes</li> <li>2. sequence of shapes</li> <li>3. variation in size of shapes</li> <li>4. variation in shape of areas</li> <li>5. emotional effect of shapes</li> </ul>
	<b>V. TEXTURE ORGANIZATION</b>
	<ul style="list-style-type: none"> <li>1. repetition</li> <li>2. sequence</li> <li>3. contrast (plain and texture, etc.)</li> <li>4. balance of texture</li> <li>5. texture used to give movement</li> <li>6. emotional effect of texture</li> </ul>
	<b>VI. VOLUME ORGANIZATION</b>
	<ul style="list-style-type: none"> <li>1. balance of weight three dimensionally</li> <li>2. movement through arrangement of volumes</li> <li>3. tension of volumes</li> <li>4. emotional effect of volume tensions</li> </ul>
	<b>VII. SPACE ORGANIZATION</b>
	<ul style="list-style-type: none"> <li>1. planes parallel to the picture-plane</li> <li>2. planes at an angle to the picture-plane</li> <li>3. tension of planes</li> <li>4. space rhythms</li> <li>5. balance of tensions</li> <li>6. realization of "picture space"</li> </ul>

PLATE II

*Choice of material.* The Renoir, "Le Moulin de la Galette", was finally chosen because it is well organized and at the same time does not arouse prejudices concerning subject-matter or realism, and so leaves the student free to analyze what formal

relations he is capable of perceiving.<sup>7</sup> Although the painting gives a first impression of complexity, even the naïve observer is capable of seeing some of the more obvious unifying devices, while the most sophisticated and discerning observers are challenged by the more subtle means employed. Plate I.

*Recording device: the check-list.* As a means for recording the responses for each subject, a method was devised whereby any possible response could be entered on a permanent record, or 'check-list'.<sup>8</sup> The check-list is divided into seven sections, each section covers the organization of one element. The subdivisions under each section cover the ways in which the element is amenable to organization. A grid at the left side of the check-list provides a place to check five responses for each type of organization. For example, one response indicating repetition of color would be recorded with a check on the grid opposite section III, item 1; another response concerned with another instance of color repetition would be recorded with a second check under the same classification. It is assumed that a mention of five instances of any one item would indicate that that type of organization was fairly well comprehended. Plate II.

The final list was approved for its adequacy and completeness by a group of art-educators, artists, and art-psychologists.

*Procedure.* In each high school an unused school room was assigned to the experimenter. The picture was placed where it would be well lighted and close enough to the student and experimenter so that it could be seen easily by both. The students were sent in one at a time. The experimenter greeted each student as he came into the room and talked for a moment or two about irrelevancies to put him at his ease, and to avoid any

<sup>7</sup> Although data were also obtained in the early stages of the study from Cezanne's "House on the Hill," his "Mount Ste. Victoire" (Metropolitan Museum) and several others, the superiority of the Renoir for the purposes of the study was soon evident and hence concentration on it. The data from the other pictures amplify and in no sense vary from findings as reported in the study.

<sup>8</sup> The idea of the check-list procedure was original with Mrs. Clair, and used by her first in Nashville and St. Louis in 1935-36. Mrs. Clair was eminently qualified by training, education and artistic proficiency to use such a complex device effectively. In less experienced and inadequately trained hands the procedure would present some problems and difficulties.—EDITOR.

suggestion of a test situation. The observer was then shown the picture and given the following instructions:

"We're trying to find out what things there are in pictures which interest all sorts of people. I'd like to have you look at this painting (indicating picture) and tell me just what you think of it. Look at it as long as you like, and as you do so, think of it as a composition that has been planned, or organized, or patterned, or designed.<sup>9</sup> Consider all the things the artist had at his disposal—the lines, the darks and lights, the colors, and textures, and shapes, and spaces—tell me all that you can about the ways he has arranged these things to make the composition more pleasing to you."

The student was encouraged to talk freely. The experimenter maintained a disinterested but friendly attitude, never contradicting or adding anything to the student's observations. When the student seemed at a loss for something to say the experimenter went through the headings on the check-list saying:

"Is there anything more you would say about the arrangement of the lines?" When the student had said all that he could concerning the lines, he was asked to say more about the dark and light arrangement, and so on, until all the section headings in the check-list had been mentioned. As the student spoke, his remarks were recorded under the proper sub-headings on the check-list.

Toward the end of the interview the student was asked if he liked the painting, if he felt that it was balanced, and whether he liked it better after looking and talking about it than when he first saw it. These answers were recorded in code on the check-list.

*Subjects: The trained group.* St. Louis, Mo., and Nashville, Tenn., were selected as having typical urban high schools with about as much emphasis on art in the curriculum as the average city system. The art courses include work in decorative design, a small amount of applied design, sketching from the costumed model and still-life, and some experience in interior decoration

<sup>9</sup> It was necessary to use several terms so as to include all possible variations in terminology familiar to the student (8).

and commercial lay-outs. The training received is thorough in its attempt to give the student an understanding of two dimensional design, but like most high school courses is not particularly concerned with three dimensional plastic relationships. As far as could be determined, picture analysis as used in this study is not one of the methods used to teach appreciation, and none of the students was familiar with the picture used. One-hundred-sixty-five students were selected from the art classes of the St. Louis high schools on the basis of extensity of training and special ability as judged by the various art teachers. Thirty-five students were selected from Nashville high schools on the same basis as those selected in St. Louis. The students in these two groups were from the Sophomore, Junior, and Senior classes. The mean I.Q. for the trained group was 99.85.

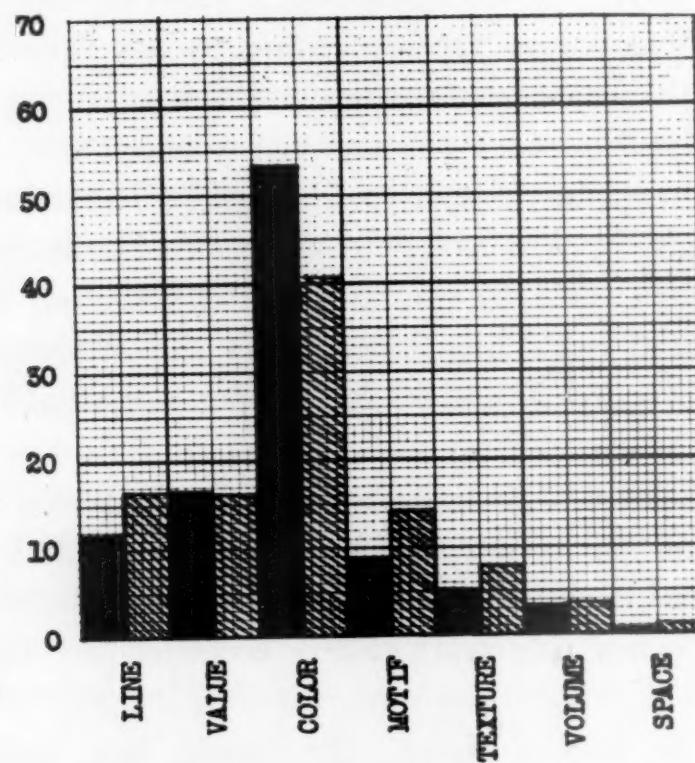


FIG. 1. Proportion of response for each category, both groups. The shaded line represents the trained group; the solid line the untrained.

*The untrained group.* The group of two hundred students used from the Beaverhead County High School in Dillon, Mont., were selected because they had had no formal high school art training, and since most of them came from rural communities,

they had had very little contact with paintings. Not any of them were familiar with the painting used in this study. No I.Q.'s were available for the Dillon subjects, but since it was a large group, from an average community, it might be assumed that the I.Q.'s are, like the trained group, about average.

*Reliability.* The recording of the students' naïve observations under the equivalent sub-classifications in the check-list involves a subjective element which is impossible to avoid. For this reason a reliability check was necessary. A research assistant with an understanding of three dimensional design was trained in the use of the checking device until she was thoroughly familiar with the method and could use the check-list with facility. After the training period, both the experimenter and the checker

TABLE I. *Check-list totals, item by item, for trained and untrained groups*

Trained Group	Untrained Group
I. Line	I. Line
(1) 291	(1) 166
(2) 36	(2) 23
(3) 163	(3) 90
(4) 176	(4) 86
(5) 83	(5) 36
Total 749	Total 401
II. Value	II. Value
(1) 77	(1) 46
(2) 235	(2) 234
(3) 220	(3) 104
(4) 176	(4) 149
(5) 39	(5) 29
Total 747	Total 562
III. Color	III. Color
(1) 340	(1) 344
(2) 121	(2) 52
(3) 153	(3) 188
(4) 61	(4) 164
(5) 218	(5) 238
(6) 275	(6) 268
(7) 200	(7) 169
(8) 113	(8) 105
(9) 84	(9) 65
(10) 171	(10) 142
(11) 113	(11) 70
Total 1849	Total 1805
IV. Motif	IV. Motif
(1) 209	(1) 110
(2) 52	(2) 28
(3) 117	(3) 61
(4) 160	(4) 73
(5) 101	(5) 25
Total 639	Total 297

TABLE I—Continued

Trained Group		Untrained Group	
V.	Texture	V.	Texture
(1)	73	(1)	70
(2)	17	(2)	5
(3)	145	(3)	59
(4)	24	(4)	19
(5)	39	(5)	8
(6)	58	(6)	13
	Total 356		Total 174
VI.	Volume	VI.	Volume
(1)	79	(1)	87
(2)	47	(2)	17
(3)	9	(3)	4
(4)	12	(4)	1
	Total 147		Total 109
VII.	Space	VII.	Space
(1)	17	(1)	19
(2)	2	(2)	0
(3)	8	(3)	0
(4)	13	(4)	8
(5)	6	(5)	0
(6)	13	(6)	4
	Total 59		Total 31
	Grand Total 4,546		Grand Total 3,379

recorded simultaneously, but independently, responses for thirty observers. The checker sat unobtrusively to one side while recording the students' observations on the check-list. Later these records were compared, and the reliability determined by correlating the total scores, the item scores, and by finding a simple percentage of agreement, item for item. The correlation for the total scores was .99; number of items checked .96; and the percentage of agreement, item for item, was 87.9%.

*III. Results. Part I.* It will be seen from an inspection of Fig. 1 that there is considerable variation in the direction of attention between the groups as indicated by the proportion of responses for the different categories. The trained group was notably more aware of line and motif, whereas the untrained group was more interested in color. The fact that the actual number of responses for color was about equal for the two groups (Table I) would indicate that color arrangement is more within the realm of everyday experience than other types of organization.

The correlation between the total score and the number of

items checked was computed by the Spearman product-moment formula for both groups. For the trained group  $r=.83 \pm .015$ ; for the untrained group  $r=.62 \pm .03$ . The mean, median and mode for total scores and item scores are tabulated in Table II.

TABLE II. Total score and item score,\* both groups

	Trained Group			
	Mean	S.D.	Median	Mode
Total score	22.10	26.02	15.22	9.00
Item score	10.80	7.04	10.00	7.50
	Untrained Group			
	Mean	S.D.	Median	Mode
Total score	17.36	14.28	15.20	6.50
Item score	6.76	5.56	8.64	4.50

\* Item score refers to number of item checked without regard to multiple checking.

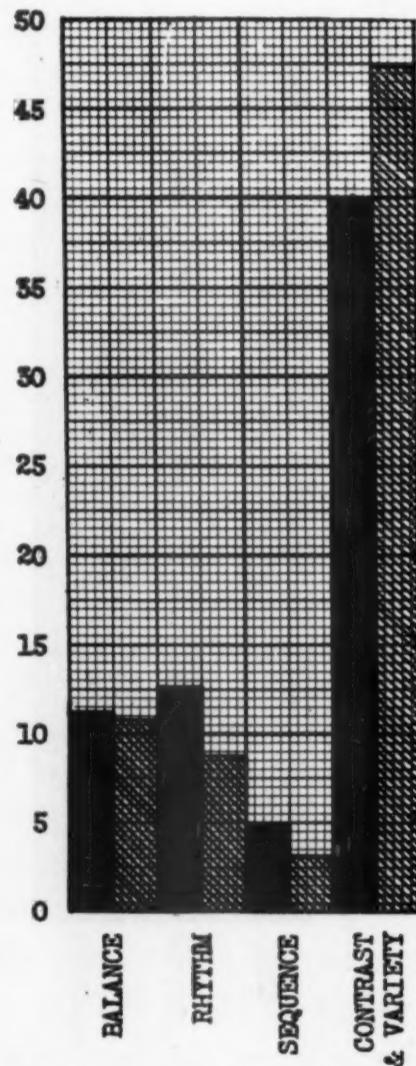


FIG. 2. Proportion of total scores for various principles. The solid line represents the trained group; the shaded line the untrained.

There seemed to be a slight tendency for the untrained group to mention more instances of the types of organizations that they did perceive, whereas the trained group mentioned a proportionately larger number of types of organizations, but not so many instances of each one (Fig. 2).

TABLE III. *Mean score for each category*

	Trained	Untrained
Line	3.94	2.86
Value	4.52	2.88
Color	8.41	8.44
Motif	3.06	1.66
Texture	1.70	1.05
Volume	.72	.63
Space	.31	.18

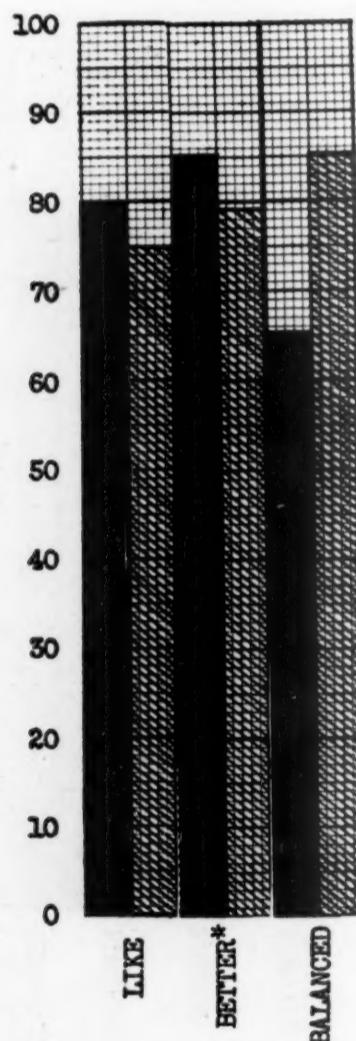


FIG. 3. Proportion of group response for various impressions, both groups. The solid line represents the trained group; the shaded line the untrained. \* Better liked after analysis.

Only 65.5% of the trained group felt that the painting was balanced; 85.5% of the untrained group felt that it was balanced (Fig. 3). Since the picture is three-dimensionally, rather than two-dimensionally balanced, this would seem to indicate that the trained group, because of their training in two dimensional balance see three dimensional relationships less readily.

The fact that such a large percentage of students liked the painting better after having considered it analytically (Fig. 3) supports the contention that analysis does not destroy aesthetic pleasure.

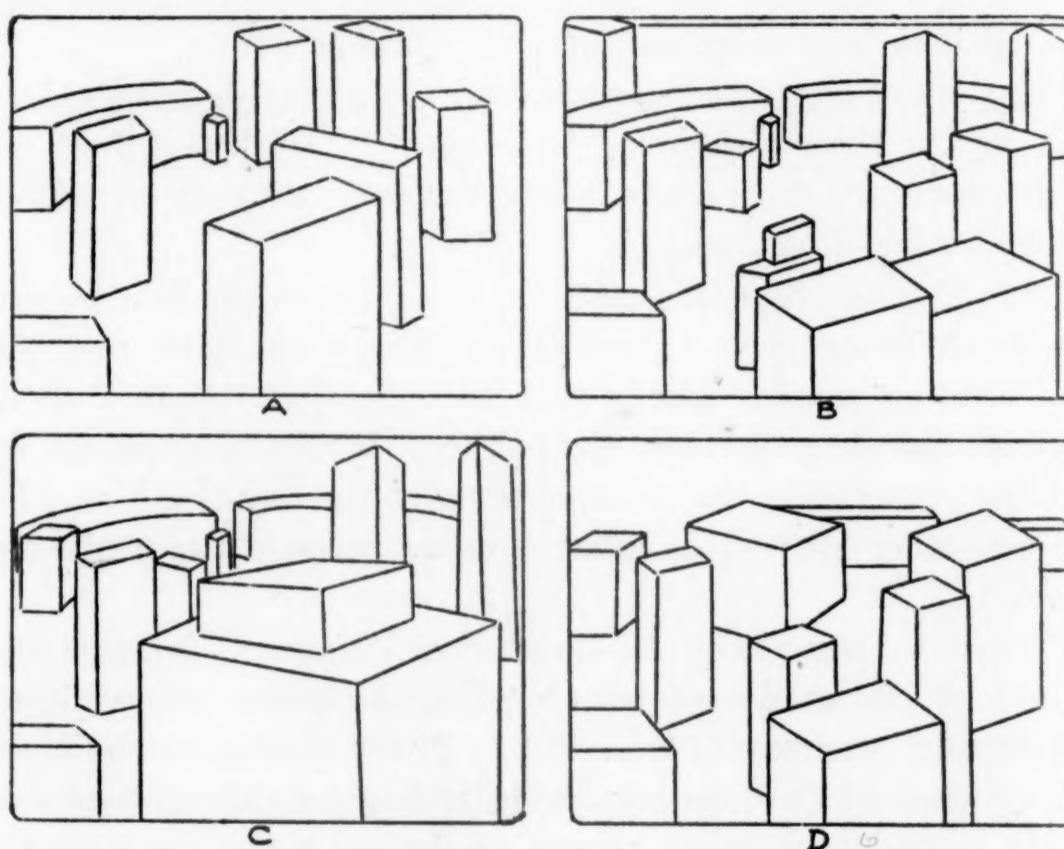


PLATE III

*IV. Technique. Part II.* The results thus far on the check list showed a fairly general paucity of responses for the two categories concerned with three dimensional relationships (see Fig. 1, Volume and Space). It is believed that this might be due to the fact that the students were blocked because of inability to express these more subtle relationships with the same degree of verbal clarity as the more elementary considerations even

though they may have been intuitively aware of them. Consequently, it was decided that some technique other than verbal response should be introduced at this point to determine the students' ability to recognize these relationships. After some preliminary experimentation, a  was decided upon.

Four diagrams of varying degrees of accuracy, showing the organization of the volumes were constructed (see example, Plate III) for each of three paintings.<sup>10</sup> Likewise, the spatial or plane relationships were diagrammed, (Plate IV; others not illustrated) and for two of the paintings the dark and light arrangement was diagrammed (not illustrated).

A group of students in a darkened room was shown a colored slide of the "Le Moulin de la Galette". With the three sets of diagrams for this picture before them the students were given the following directions:

"Look at the four diagrams A, B, C, D, on the first page of the leaflet before you (Plate III). Try to imagine that they are cubes or wooden blocks that have been set up in a model stage so that they represent the picture. Which diagram do you feel best represents the arrangement of the painting?" (The subjects were allowed as much time as necessary to make this choice.)

"Turn to page two—In these four diagrams, imagine that instead of the blocks we set up triangular pieces of cardboard one behind another (Plate IV). These represent the space arrangement of the painting. Which diagram do you feel most nearly represents the arrangement of the picture on the screen?" (time allowed for choice).

"Turn to page three—In these diagrams you will find some areas are covered with small dots, some areas are plain. The dotted areas represent the dark pattern of the painting; the plain areas represent the light pattern. Which of the four best fits this picture?

A colored slide of *Ta Matete* was thrown on the screen. The

<sup>10</sup> Renoir, "Le Moulin"; Gauguin, "Ta Matete"; and Di Giusto, "Agony in the Garden" Only the first is illustrated.

students were given a set of diagrams for this picture, and the same directions were given for these diagrams as for the previous sets. The procedure was repeated for Di Giusto's "Agony in the Garden".

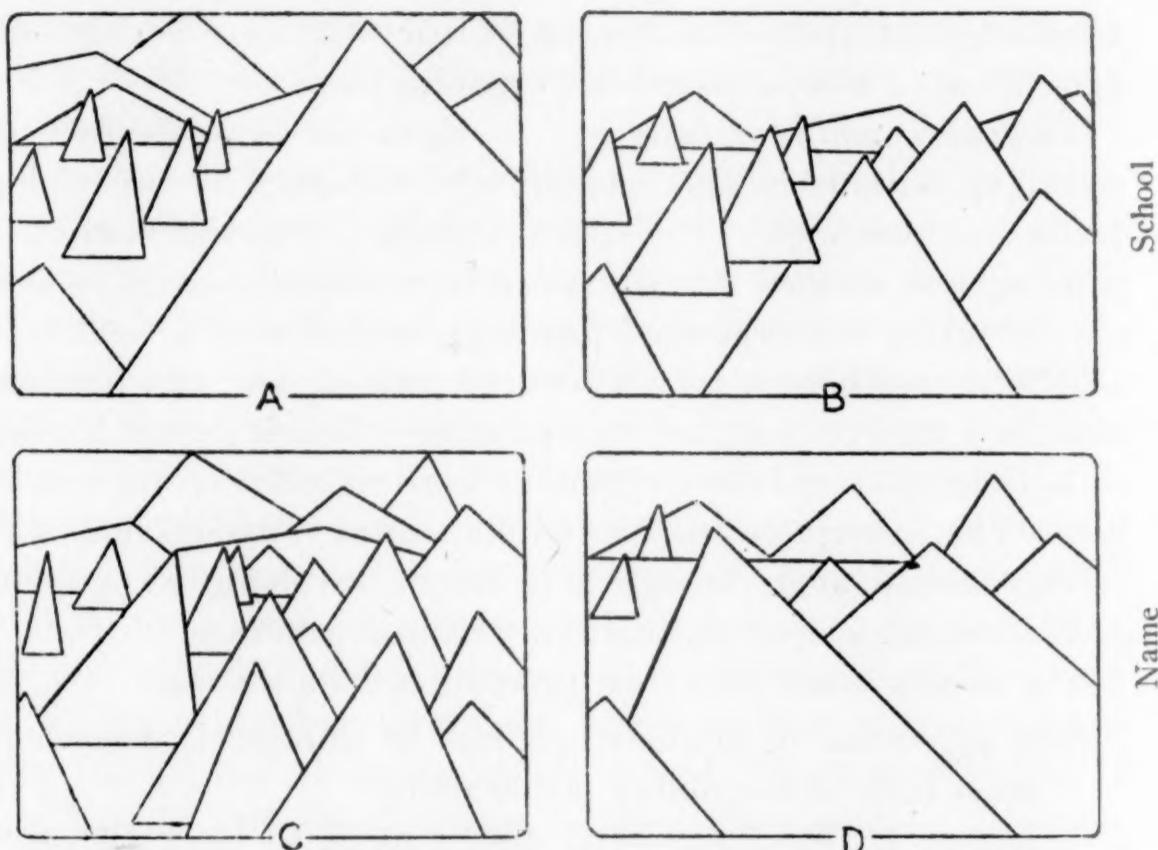


PLATE IV

*V. Results. Part II.* The percentages of correct choices for the diagrams are shown in Table IV. There is more variation in accuracy of choice from diagram to diagram within each group than between the two groups. This is probably due to the fact that the nature of the material made it difficult to equate the sets for accuracy. It is significant, however, that in four out

TABLE IV. *Recognition of Structure\**

	RENOIR			GAUGUIN			DI GIUSTO		
	Volumes	Space	Values	Volumes	Space	Values	Volumes	Space	
Trained	70.2	67.8	79.5	76.1	41.7	68.4	60.2	77.1	
Untrained	64.4	77.5	93.4	97.3	46.0	81.5	58.0	86.8	

\* Figures are in percentages.

of the six sets that were concerned with three dimensional relationships (volume and space) the untrained group exceeded the trained group. This would tend to strengthen the conclusion made from the responses (by impression on balance) that is, training in two dimensional design, unless supplemented by knowledge of three dimensional plastic relations, inhibits the perception of three-dimensional organization.

*Summary and conclusions:* A check-list was devised to record quantitatively and qualitatively responses to organizing factors in paintings. Through preliminary experimentation, a painting was selected that contained representative qualities usually found in well-organized paintings, and offered a wealth of analytical possibilities. Two-hundred trained, and two-hundred untrained subjects analyzed this painting—Renoir's "Le Moulin de la Galette"—and their responses were recorded on the check-list. The perception of three-dimensional relationships was further investigated through a technique involving recognition of diagrammatical representations of three paintings.

The results from these two procedures indicate that:

1. The perception of aesthetic qualities in painting is dependent upon both native ability and training.
2. Training in two-dimensional design tends to block the perception of three-dimensional relationships.
3. If three dimensional relationships are diagrammed, both the trained and untrained students are able to recognize them.
4. An analytical and searching attitude does not militate against aesthetic pleasure. This finding is contrary to Kant's belief that close analysis of a work of art tends to destroy one's appreciation of it.
5. There is a difference in the direction of attention between the trained and the untrained; the trained individual gives a wider variety of responses.

*Possible significance of these findings to art education.* Conclusions 2 and 3 point out the limited value of instruction in two-dimensional design. If the objective of art training is *greater appreciation* for the student, it would preclude narrowing his range of appreciation to a two-dimensional sphere, for

thereby he is shut out from a *full* appreciation of most of the masterpieces painted during, and since, the renaissance.

Because diagrammatical presentation of the main formal qualities of a work of art can be comprehended by both groups, it seems logical to conclude that a stronger emphasis upon visual teaching aids as opposed to lecture and discussion methods might be employed to further appreciative pleasure on the part of students.

Conclusions 5 and 6 indicate that thorough critical and appraising analysis of works of art, provided that the totality of effect is kept always in mind, does not tend to destroy the students' pleasure in art; but rather deepens and widens, and intensifies his appreciation. The observers, in this study, seemed non-appreciative almost to the same extent that they were non-analytical in attitude. Consequently this study points toward more intelligently applied analysis. Intellectual curiosity as to the structural values is not incompatible with emotional reaction to the totality.

It is not within the province of this article to determine the optimal period at which training in three-dimensional art may be introduced to best advantage. Possibly it is somewhat complex for the typical senior in high school. Perhaps it is best if left for the college classroom or special art school. It is the belief of the author, however, that, granting ability in the student to grasp it, there can be only gain in appreciative pleasure, wherever and whenever introduced.

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## VARIABILITY IN PREFERENCES FOR SIMPLE FORMS

by

GILBERT BRIGHOUSE

*I. Introduction.* Fechner in 1876 formulated what has come to be known in English as the "unity-in-variety" principle, which may be stated briefly as follows: "An object is apprehended as beautiful to the extent to which it combines a pleasing variety within a unity." Later reformulations of this principle have been given by a number of other writers, including notably Langfeld (6), Martin (7) and Jodl (5). It is probably the most generally accepted of all aesthetic principles.

Stratton (11) suggests however that unity-in-variety of itself is aesthetically indifferent—a mail box having just as much variety within a unity as does a Greek vase. In answer to this Dewey points out that everything depends on how the "in" is understood. A morphological or static unity, as for example that of coins in a match box, is aesthetically ineffective. "The unity in variety that characterizes a work of art is dynamic. The formula has meaning only when its terms are understood to concern a relation of energies." (4, page 161.)

As a corollary to this principle it has been suggested by several writers that individuals differ in their ability to synthesize varieties into unities and that they appreciate as most beautiful that particular level of complexity which requires some effort to "fuse". "The barely successful synthesis, in which the individual accomplishes with difficulty the unification of a manifold, gives the keenest pleasure." According to this theory, too complicated a stimulus is regarded as chaotic, disorganized, unpleasant; too simple a stimulus as insipid, "flat", uninteresting. This hypothesis has been advanced by Moore (9), Meyer (8), and Valentine (12) as an explanation of consonance and dissonance

in music, and Moore has developed it into a genetic theory to explain historical trends in musical harmonies.

C. O. Weber has made an application of the hypothesis to graphic art, and reports two experiments which support it. In the first, (13), he obtained paired comparison rankings on a series of seven crosses of varying complexity and also on a set of ten coverlet designs. Between the "complexity preference" level and "apperceptive power" (as measured by the Heilbronner picture-completion cards) he found correlations of .392 and .412 for two groups. There was a slight positive correlation between "apperceptive power" and intelligence and grades.

In a later experiment, (14), Weber took two sets of paired comparisons, two weeks apart, for sixty-eight women subjects on nine rectangles of equal area but of proportions ranging from the square to the root five rectangle. He reported that on the second trial there was a constant shift toward the more complicated forms, with more certainty than on the simpler. This experiment, however, is open to criticism because of the identification of complexity with "narrowness" of shape.

*II. Experimental procedure.* Materials included in a publication by Birkhoff (2) in 1933 presented an opportunity for testing Weber's hypothesis experimentally. Birkhoff's purpose was to set up a series of geometrical figures whose aesthetic "order" and complexity he could measure. His argument was that the two variants, unity and variety, are in a mathematical relation which can be expressed by the formula:

$$M = O/C$$

where  $M$  is the "aesthetic measure" of an art object,  $O$  is the order or unity, and  $C$  is the complexity or variety. For geometrical forms  $O$  is obtained from the formula:

$$O = V + E + R + HV - F$$

where  $V$  indicates vertical symmetry,  $E$  equilibrium,  $R$  rotational symmetry,  $HV$  relation to a horizontal-vertical network, and  $F$  unsatisfactory form. Each of these is assigned a weight according to the degree to which it operates in any given figure.

Complexity,  $C$ , is defined as "the number of indefinitely extended straight lines which contain all the sides of the poly-

TABLE I. *List of forms*

Plate No.	Birkhoff's No.	M	C
1	7	.90	5
	4	1.00	4
	3	1.16	3
	5	1.00	6
2	12	.62	8
	10	.71	7
	14	.58	6
	11	.63	3
3	72	.00	5
	75	.00	6
	82	.00	7
	87	.00	9
4	70	.00	3
	71	.00	5
	86	.00	9
	81	.00	7
5	27	.42	6
	28	.40	5
	24	.50	8
	29	.40	10
6	20	.50	6
	21	.50	8
	18	.50	4
	25	.50	12
7	51	.21	12
	53	.20	10
	52	.20	5
	54	.17	6
8	32	.37	8
	41	.33	12
	35	.33	6
	43	.29	7
9	48	.25	8
	50	.25	12
	27	.25	8
	26	.25	4
10	69	.05	9
	61	.14	7
	66	.12	8
	57	.17	6
11	O 17	.40	10
	O 16	.40	5
	O 18	.40	15
	O 15	.42	12
12	V 13	.62	8
	V 7	.58	12
	V 15	.80	10
	V 22	.58	12

gon". (2, 34.) For the forms used in this study, C ranged from three to fifteen.

Such a method of weighting as that used by Birkhoff obviously

involves many arbitrary selections. However, it represents a step in the right direction in that it attempts to fractionate the elements entering into aesthetic experience and it does provide a measure, however crude, of the pleasingness of simple forms.

Some degree of validation of Birkhoff's method was found by showing eighteen of his polygons, representing the complete range of  $M$ , to twenty-two adult observers who by a paired comparison technique ranked them in order of preference. A correlation of  $.77 \pm .11$  was found between  $M$  and the mean order of preference. This is taken to indicate a satisfactory degree of reliability.

If Weber's hypothesis is correct, then for forms which are objectively equal in aesthetic merit (Birkhoff's  $M$ ) but which differ in complexity ( $C$ ), there should be an increasing preference for the more varied forms with age and experience. To test this, forty-eight of Birkhoff's figures were reproduced, four each on cardboards size 13" x 15". The four figures were so selected as to have a constant or nearly constant  $M$  value, but varying  $C$  values. Table I shows the numbers of the forms, from Birkhoff's published list (2, pp. 32 ff); the aesthetic measures and the complexities. On each card the forms were arranged in random order as regards complexity. They were chosen to be as associatively neutral as possible.

The observers were instructed to put down on a record blank their order of preference according to the following directions: "Look carefully at these four figures; decide which one you like the best, which one is most intrinsically pleasing; then decide on the second, third, and least pleasing figure."

In order to determine the complexity level for each observer, the results were scored as follows: the first place (most agreeable) was given a weight of four, the second of three, third of two, and last place, one. These weights were then multiplied by the corresponding complexity values, the total of these products for the forty-eight figures giving for each observer a number whose magnitude was directly proportional to his preferred complexity level. This complexity score had a possible range

from 805 (most simple) to 1024 (most complex), but the actual variation was from 842 to 1008.

The reliability of this scoring method was determined both by the method of internal consistency and by repetition. Dividing the material into two halves, odds and evens, a coefficient of reliability of .78 for one hundred unselected observers was obtained. On repetition of the experiment at intervals ranging from ten days to eight weeks, sixty-four observers showed a coefficient of correlation of .90. These coefficients indicate a satisfactory reliability for the method.

As an indication of validity, thirty-eight individual observers were asked, at the conclusion of the experiment, to report verbally on the criteria used in making their selections. Fifteen gave reasons in terms of simplicity, complexity, variety, unity, or related terms. The remainder were unable to name their bases for choice.

Results were obtained for a total of 352 observers. 179 were children from ages six to fourteen; 113 were adults; and 50 were inmates of an institution for the feeble-minded, classified as either morons or imbeciles.<sup>1</sup> Records for adults and feeble-minded subjects were obtained in individual situations, those for children both individually and in school classes averaging twenty-five to thirty members.

*III. Results.* Table II shows frequency distributions and means of complexity scores for five groups: artistically trained adults; artistically untrained adults; second to sixth grade children in a school with a highly developed course of instruction in fine art; fourth and fifth grade children in three schools giving little or no art training; and feeble-minded subjects. High scores indicate preference for more complicated forms, and vice versa.

Despite overlapping, Table II shows a clear and significant trend toward increasing preference for simpler forms with increasing age and experience in art. This is in exact contradiction to Weber's hypothesis and experiments. Further, for sixty-four observers there was no evidence of the tendency which

<sup>1</sup> Results on feeble-minded individuals were obtained through the help of Miss Jane Mangas of Lincoln, Illinois.

would be expected for more complicated forms to be preferred on repetition of the experiment. If anything, the trend was slightly in the other direction.

*IV. Conclusions.* There are several possible explanations for the failure of this experiment to verify Weber's theory.<sup>2</sup> First, Birkhoff's measures may be unsound. However, if the measures were completely untrustworthy, one would expect to find a

TABLE II. *Frequency distribution of complexity scores*

Scores	Trained Adults	Untrained Adults	Trained Children	Untrained Children	Feeble- minded
1001-1010	1		2	3	2
991-1000		1	12	5	6
981- 990		11	19	11	8
971- 980		7	25	9	11
961- 970	3	3	15	4	10
951- 960	3	6	10	10	6
941- 950	4	2	9	3	3
931- 940	10	3	6	1	1
921- 930	13	4	8	2	1
911- 920	15	2	3		1
901- 910	11	3	6	1	
891- 900	7		1		1
881- 890	7		2		
871- 880	4		2		
861- 870	1				
851- 860					
841- 850	1				
Number of cases	80	33	120	59	50
Mean Scores	915.9	950.2	959.8	969.2	969.6

random scatter of scores rather than the group distinctions actually obtained. Therefore, the explanation seems to lie elsewhere. Another possibility is that Weber's hypothesis is applicable to other elements of painting but not to simple forms themselves. Further experimentation is necessary to verify this. Or third, the hypothesis may be completely erroneous in its application to graphic art, regardless of its validity in music. It seems to be the consensus of opinion among artists that the most simple, the most directly unified art, is the greatest. Greek art, for example, while extremely simple in comparison with much modern work, has yet endured for centuries. Certainly in this

<sup>2</sup> Cf. findings of Davis, R. C., (3) and Beebe-Center, J. G., and Pratt, C. C. (1).

experiment the artistically trained observers were looking for unity and simplicity of organization while the untrained children and the feeble-minded prefer the "interestingness" of varied, involved and complicated forms.

The conclusion, regardless, is clear that within the limits of this experiment, preferences for simple forms were found to be in direct contradiction to that expected according to the Weber hypothesis.

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## THE CONSISTENCY OF AESTHETIC JUDGMENT<sup>1</sup>

by

ELLEN JOHNSON CAHALAN

*I. Introduction.* Aesthetic judgment as the ability to judge between varying degrees of merit in art situations is regarded as a function basic to both art appreciation and production. It may be thought of as an inborn capacity, realizable through experience, or as a demonstrable ability, developed within the limits of individual capacity.

The exact nature of this "aesthetic intelligence" is not known. Meier (7) has shown that aesthetic judgment is distributed throughout the general population in a normal curve. Israeli (4) concluded that the law of central tendencies holds for aesthetic judgments, and that with increasing age there is less variability and more agreement. Pintner (8) found that there was a great diversity of preferences at all ages, but a more general agreement among the individuals as age increased. Voss (9) concluded that at the child-level an understanding of principles of art increases the ability to judge between varying degrees of merit.

Capacity itself is probably stable throughout life. The study was made to investigate the consistency, or stability of aesthetic judgment as a demonstrated ability of individuals, variations of response within groups, and reasons for possible changes in aesthetic intelligence.

*II. Procedure.* The procedure consisted of presenting materials designed to elicit, or test, aesthetic judgment to groups of high school and college students, and re-presenting the same

<sup>1</sup> At the high school and college age level. An investigation in the research program, Genetic Studies in Artistic Capacity, directed by Dr. Norman C. Meier and sponsored by the Carnegie Foundation for the Advancement of Teaching with aid from the Carnegie Corporation.

materials after an interval of approximately one year. The Meier-Seashore art judgment test (6) was chosen for the purposes of this investigation, as representing a valid, reliable, easily controlled and conveniently repeatable situation. The method of administering the test was, however, modified to fit the special purpose of this study. In the standardized form of the test, the subject is required to check his preference of two pictures, which are nearly alike, being supplied with a list pointing out the unlike portions. For this study the subject was not told the difference in the pictures, and was required to give a brief reason for his choice, for the first 63 items, or half of the test.<sup>2</sup> Thus not only the judgment itself was recorded, but the bases for judgment were also stated, enabling a check to be made on the stability of aesthetic criteria.

To avoid the variable effects of fatigue and loss of interest inevitable because of the length of the test, only the first half of the test was used in investigating consistency. This presented a convenient unit of 63 items, with which to work, with reasons given for each choice.

Three methods of scoring the data thus received were used. The first, designated as "choice score" refers to the number of "correct" choices made in the test, using the Meier-Seashore scoring system. The second, a consistency score, is the number of identical choices made by the subject in the two testings. The third, called the "aesthetic score", refers to the number of "aesthetic reasons" given for the choices. This score was devised to provide a general descriptive measure of the type of response, to determine whether or not the subject expressed knowledge of the principle involved in his choice.

Responses were classified as "A" (aesthetic reason) and "N" (non-aesthetic reason) by the experimenter, the classification system being a modification of one developed by Voss (9) for a similar purpose. Responses classed under A were:

1. References to principles of composition.
2. Approximations of principles of composition.
3. General aesthetic considerations.

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<sup>2</sup> Complete data is on file at the University of Iowa Library.

Responses classed under N were:

1. No reason given.
2. Essential difference overlooked.
3. Mere statements of differences.
4. Obvious stereotypes.
5. Logical, literary, or naturalistic reasons.

Each response was analyzed with particular reference to the pair of pictures which had elicited it.

It was recognized that any attempt to classify and evaluate responses into categories must of necessity depend a great deal upon the investigator's interpretation, even though the classification system was rigidly adhered to. It was, however, necessary to interpret responses of students who did not possess facility in the use of compositional terminology, to determine on what bases

TABLE I. *Percentages of agreement*

Judge	Number of Items Checked	% of Agreement
1	96	70.3
2	152	78.9
3	96	84.4
4	46	84.8
5	139	86.3
6	152	92.1
7	33	93.9
8	152	94.7
Total number checked		Average agreement 85.8

they were making their judgments, and to translate all responses into common terms. To establish the validity of this type of procedure, eight judges'<sup>3</sup> classifications were compared with those of the investigator. The average percent of agreement was 85.8. Percentages of agreement of each judge and the investigator are presented in Table I.

The subjects were divided into two groups on the basis of training in art. The "trained group" included:

(a) high school juniors and seniors, from the public schools of St. Louis, Missouri; Nashville, Tennessee; and Chicago,

<sup>3</sup> The judges, members of an art psychology seminar, represented a variety of points of view and training. Six had B.A. degrees in art or art education, and at least one year of graduate work in art psychology. Two were of doctorate standing in psychology of art.

Illinois; selected by their art teachers as being superior or good in artistic ability.

(b) college art majors, selected on the basis of availability.  
The "untrained group" included:

(a) members of a college course in elementary psychology.  
(Note: the first testing was a part of their course work; the second was optional.)

(b) members of a small class in advanced psychology under conditions similar to (a) above.

Because an interval of time was an essential part of the study, it was not possible to reach all the subjects for the second testing.<sup>4</sup> Therefore, in the portions of the investigation dealing with consistency over a period of time, the size of each group is reduced from what it is in the portions utilizing only the first tests.

The final groups secured for retesting are as follows:

Trained group:

- (a) 39 high school students (St. Louis and Chicago groups).
- (b) 14 college students.

Untrained group:

100 college students.

*III. Results. A. Consistency of choice.* Table II presents data on the choice scores of the two groups. At both testings the mean score for the trained group was significantly higher than that of the untrained group. While the mean score increased slightly in the art group, it decreased for the untrained subjects. Comparison of the coefficients of variation (3, p. 41) of the two groups on the first testing shows that the trained group is only 61% as variable as the untrained group. Individuals in the untrained group changed their scores upon re-testing by greater amounts than the art students; the median difference between scores on tests I and II was three points for

<sup>4</sup> Through failure to return to school, through non-coöperation, and unfinished records.

TABLE II. *Data on choice scores*

	Untrained Group (N=100)				Trained Group (N=53)			
	M	S.D.	PE <sub>ave</sub>	CV	Mdn. Diff.	M	S.D.	PE <sub>ave</sub>
Test I	50.18	8.92	.30	17.7	3	54.39	6.08	.34 *
Test II	48.22	10.08	.34		55.55	4.88	.27	2

○

the first group and two points for the second. This slight variation in results from a test of 63 items of a highly complex function must be regarded as indicative of a stable type of response.

While comparison of the choice scores made on the two tests is of value in demonstrating a stability of the general level of aesthetic judgment, in some cases the scores may be the same but the subject will have made errors on different items of the test. The consistency score is the number of items marked the same in both testings, which type of scoring ignores the correctness of choice and measures only consistency. Table III presents data on this score for both groups. The art students were significantly more consistent than the untrained ones.

TABLE III. *Consistency scores*

Group	N	Mean	S.D.	$PE_{ave}$	Critical Ratio	P
Untrained	100	48.12	5.12	.51	6.4	100
Trained	53	52.80	3.89	.53		

The criterion of individual consistency was set as one standard deviation below the mean consistency score for each group. By this standard nine art students and 18 non-art students were inconsistent. Data on reading habits, interest in art, formal and informal contact with art, collected by information blanks and personal interviews with each subject was analyzed to see if it might reveal reasons for changes.

Of the eight inconsistent art students, two had graduated after the first test, and were working in occupations unrelated to art: both had slightly lower choice scores on the second test. The other six were still in school, were still interested in art, and were taking art courses: all had slightly higher choice scores in the second test. Of the art students who remained consistent, all but four were still in school and were taking art courses. Although these environmental factors which might be expected to mold artistic judgments do not necessarily increase judgmental ability, none of the students who apparently lost ground had been in contact with art between the two testings. It should

be born in mind that for the trained group the test was probably of an elementary type. For college art students the universal principles exemplified in the test are probably stabilized so that a growth in aesthetic insight is not adequately recorded by response to the test materials.

Of the 18 inconsistent students in the untrained group, six reported a greater interest in art, but no study of it; of this six five increased their choice scores and one decreased it. Twelve reported no interest in art and no change in attitude; four of these had increased choice scores and eight decreased scores. In the group that remained consistent, 11 reported increased interest in art, their interest taking the form of attendance at campus exhibits, discussions with friends and non-systematic readings. These all reported a belief that their ideas had changed since the year before, but no significant variation in choice was evident. This may probably be referred to imperfectly controlled motivation in the test situation and inadequacy of the subjects to report a real change in attitude.

No positive claim is made that the above observations indicate a definite conclusion, as the type of data is necessarily proximate, and subjects limited in number. It is suggested, however, that the relation between interest in art and aesthetic judgment would be a fruitful field for study.

The correlation of consistency scores with the first test scores for the two groups combined was  $.75 \pm .024$ . Persons with initial high scores in aesthetic judgment have a more stable type of response than those with lower scores.

On the basis of choices of pictures it may be concluded that there is a central tendency of consistency, subject to variations probably due to individual differences in receptivity to change, or to changing interests. Art students are more like each other, and more consistent from year to year than a group of non-art students. This is in harmony with Israeli's conclusion that there is a qualitative similarity of reaction within groups, with quantitative differentiation due to individual differences.

*IV. Bases for judgment. Relation to choice score.* The aesthetic score, so-called because of the relation of the classifica-

tion type "A" responses to the aesthetic attitude, represents more than anything else the basic point of view of the observer. A high score means attention to the problem as a pictorial one, and attention to recognized compositional elements. A low score indicates a probably naïve point of view, either in regarding the picture as a story-telling device, or in being unable to recognize the factors constituting an aesthetic judgment.

Presumably, verbalized known bases for judgment might accompany a high degree of judgment, and uncertain bases a lower degree. It was believed that this hypothesis would be tested by determining the correlation between the aesthetic score and the choice score. The results are seen in Table IV.

TABLE IV. *Correlation of aesthetic score with choice score*

Group	N	Choice Score		Aesthetic Score		r
		M	S.D.	M	S.D.	
Trained	98	55.40	3.19	54.32	3.30	.67±.04
Untrained	209	41.00	5.80	50.33	3.01	.55±.03

The correlations indicate the probability that conscious attention to compositional qualities does accompany increased ability in judging the merits of two paintings.

*B. Consistency of aesthetic score.* The consistency of aesthetic scores is presented in Table V. There is a completely reliable difference between the mean aesthetic scores of the trained group and the untrained group; the trained group considers compositional qualities in judging pictures more than does the untrained group. Comparison of coefficients of variation shows the trained group to be only 64% as variable as the other group. It was believed that with this type of score, which represents a qualitative, generalized point of view, a general indication of consistency would be expressed by the correlations of the two scores. The chances are 99 out of 100 that there is a true difference greater than zero between the consistency correlations of the two groups. The mean difference for the trained group was 3.5 and 6.08 for the untrained group, which increases the chances of a true difference between the groups.

TABLE V. Data on aesthetic scores

	Test I				Critical Ratio	P		
	M	S.D.	PE <sub>ave</sub>	CV	M	S.D.	r	Between means on Test I
Untrained (N=100)	43.98	8.76	.59	17.7	40.49	7.58	.47±.05	13.5 100
Trained (N=53)	52.82	6.16	.26	11.4	52.76	5.84	.70±.06	3.3 99 Between the r's

Together with the facts that the trained group is more consistent than the untrained group, and that people with high scores are more consistent than those with low scores, the higher correlation for the trained group points to the conclusion that people with verbalized bases for their judgments have a more stable foundation for their aesthetic judgments than the probably more arbitrary and uncertain reasons of the untrained group.

*C. Consistency in relation to age and sex.* The correlation of consistency scores with chronological age was  $-.025$ , which means that within the age-distribution of the combined groups there is no relation of consistency to age. However, there was not represented an adequate sampling of more than one age group; the mean age was 19.7 years, with a standard deviation of 5. The results should not be interpreted as contradictory to those of Pintner (8) and Israeli (4), who worked with both children and adults.

TABLE VI. *Sex differences of untrained group*

	A.S. Mean	% Varying More than 8 Points	C.S. Mean	% Varying More than 5 Points	Mean Diff.	C.S. Mean
Boys (N-42)	37.5	20	49.4	32	4.4	46.8
Girls (N-58)	44.8	19	52.4	16	2.8	49.1

Table VI shows results when the untrained group is divided according to sex. The boys are slightly more variable in their choices than the girls, but are no more or less variable in the reasons. The mean choice scores and mean aesthetic scores are higher for the girls. These results bear out the findings of Carroll and Eurich (1) that women show a higher degree of aesthetic judgment than men do. Since there is a positive correlation between high scores and consistency, the greater consistency of the girls may be attributed to the fact that they had higher scores to start with. They also had more aesthetic bases for their choices, which would lead to greater consistency.

In the trained group there is no apparent difference in consistency between the boys and the girls. 13% of the boys (N-13) and 16% of the girls (N-30) varied five points or more on the two choice scores. The mean difference on aesthetic

scores was 3.5; 26% of the boys and 26% of the girls varied 5 points or more. The mean consistency scores were 52.7 for the girls and 52.9 for the boys. Differences in average choice scores were not computed, because of the small number of subjects and the unequal division of the group.

In the untrained group, girls are slightly more consistent than boys, but this difference disappears in the trained group. The basis of the difference in the untrained group may be the traditionally greater interest of women in clothes, design, and art. There is probably no such difference in interest in the trained group.

*IV. Consistency of both choice and bases.* Considering the response to each item of the test, with its two variables, choice and type of reason, there are 16 types of relationships possible between the first and second response of any individual. For example, if item number one is marked "AR" (aesthetic reason and right choice) it may be marked the same the second time; it may be marked "NR" (non-aesthetic reason and right choice); "NW" (non-aesthetic reason and wrong choice); or "AW" (aesthetic reason and wrong choice). If it is marked "NR" the first time, it may be marked any of the other types the second time, and so on. There are four ways the responses may be consistent, and 12 ways they may vary, in choice or reason or both.

Seventy-six sets of tests, chosen at random, 38 from trained and 38 from untrained subjects were analyzed in this way, item by item. Results are presented in Table VII. Responses which are aesthetic in type and correct in choice are more stable than any other type of response, in both the trained and untrained groups.

The greatest variability in the untrained group is in the change from NR to AR and from AR to NW. In the trained group the greatest variability is in the change from NW to AR and from AR to NW, but the amount of change is less than the same changes in the untrained group. Grouping the consistency showing relations together, and the variability showing types together, the trained group shows more consistency and less

variability than the untrained group. This tends to strengthen the differences between the groups shown in previous sections.

*V. Group consistency in response to individual items.* Choices of 125-160 untrained and 94-98 trained subjects were tabulated, with the object of seeing which items of the complete Meier-Seashore test elicited the most and least consistent responses.<sup>5</sup> As a rule the untrained group had a greater percent

TABLE VII. *Consistency of choice and reason. Both groups*

	Trained Group % of Total Number	Untrained Group % of Total Number
AR - AR	69.46	49.37
NR - NR	1.75	7.05
NW - NW	3.42	7.26
AW - AW	.71	.62
Total consistency—	75.35	64.32
AR - NR	3.84	5.97
AR - NW	5.84	7.14
AR - AW	.41	.50
NR - AR	4.80	8.68
NR - NW	.54	2.38
NR - AW	.04	.04
NW - AR	5.84	6.14
NW - NR	1.00	2.29
NW - AW	.20	.25
AW - AR	1.42	1.25
AW - NW	.58	.78
AW - NR	.08	.20
Total variability—	24.64	35.67

of errors than the trained group, although for some items this was not true. Consistency of response is seen to be dependent upon the materials used, even within the limited range of variety represented here. It may be inferred that varying other elements, such as color, size, and number of possible choices, would also affect consistency of responses.

#### SUMMARY AND CONCLUSIONS

Records of preferences and reasons for preferences were obtained on 63 pairs of pictures from high school and college art students, and from unselected college students. These were

<sup>5</sup> On file in the Art-Psychology division of the University of Iowa, Department of Psychology, is the complete list with percentages of errors.

then analyzed and compared with records obtained from the same subjects approximately a year later.

Within the limits of this study, the following conclusions were drawn:

1. In general, aesthetic judgment is consistent within groups, and in individuals over a period of a year.
2. Art students are more consistent than non-art students, both as individuals and as a group.
3. High aesthetic judgment scores tend to be more consistent upon repetition of the test than low scores.
4. Age did not seem to be a significant factor of consistency in the group studied.
5. Girls untrained in art are slightly more consistent than boys untrained in art. This sex difference does not appear among art students.
6. Consistency of response depends upon materials used, as well as upon the observer.
7. Aesthetic judgment is positively related to conscious knowledge of compositional principles.

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# CREATIVE IMAGINATION IN CHILDREN AND ADULTS<sup>1</sup>

by

WILLIAM McCLOY

*I. Introduction.* Creative imagination may be defined as the ability to envisage combinations and recombinations of experiential material into original or unique organizations. It exists in many forms, and possibly to some degree in every construction.

Creative imagination in the realm of art leads to results generally considered superior to those attained by mere technical virtuosity. Although creative imagination has been poorly understood and not thought of as subject to objective investigation, this study nevertheless presents a possible approach to experimental study in the field, and offers experimental findings that may contribute toward better understanding.

For the purpose of investigation, creative imagination was divided into two convenient and arbitrary categories; passive creative imagination and active imagination. The first requires no manual or constructive performance, confining itself to critical appraisals and interpretation of works already prepared. Active creative imagination on the other hand requires performance. The inclusion of the passive type permitted experimentation among both trained and untrained subjects without penalizing the untrained.

*II. Active creative imagination.* Since it was desired to

<sup>1</sup> This study utilized the creative composition apparatus described in Volume II, *Studies in the Psychology of Art* (N. C. Meier and W. A. McCloy), *Psychological Monographs*, Volume 48, No. 1, 1936, pp. 164-172. The investigation is part of a continued research program, *Genetic Studies in Artistic Capacity*, directed by Dr. Norman C. Meier and sponsored by the Carnegie Foundation for the Advancement of Teaching with financial aid from the Carnegie Corporation.

investigate the creative imaginative process apart from technical excellence and other complicated factors, an apparatus would be required that would employ a medium of uniform difficulty for both young and old subjects and yet present possibilities for an extensive range of results describable in quantitative and qualitative terms. It was desirable also to utilize materials of general interest, easily varied and sufficiently workable and simple to obviate feelings of self-confidence among the more timid.

*III. Apparatus.* The creative composition apparatus illustrated elsewhere was constructed with the above considerations in mind.<sup>2</sup> It is relatively simple yet involves a large number of controllable elements. The stage is an open framework measuring 30"x30"x36", enclosed on two sides and on the front with movable black curtains to permit framing of objects and serve as partial controllers of lighting conditions. Across the back was stretched a translucent Vellum tracing paper which served as a screen on which backgrounds were projected from the rear by a 1000-Watt Spencer Delineascope. The pictures used for these backgrounds were selected largely from Seemann prints. The lighting equipment and controls as well as the placement of batteries of colored lights are described in the preceding volume.<sup>3</sup>

The apparatus was situated in an old operating room of East Hall, which was originally a hospital. The room was without windows and had a skylight covered with opaque cloth, which permitted the apparatus to be operated in semi-darkness even with full daylight outside. A Leica camera was used (with Panatomic fine-grain and Leica-Dufay film). An adjustable photographing stand, a stop watch, an illumination-meter constructed especially for the purpose, and recording blanks on which could be entered besides the usual information the reading of all five dials and the placement of all movable spot- and flood-lights, were the materials used in carrying out the experiment. Also, nine clay-base-forms averaging about 8" in height and about 20" wide with a depth of about 15" were used.

<sup>2</sup> The apparatus was designed by Dr. Norman C. Meier with the collaboration of Hunton D. Sellman, technical director, University Theatre. See Vol. II.

<sup>3</sup> *Ibid.*, p. 167 ff.

One of these was for demonstration; the subject worked with the others. Some of these base-forms and typical backgrounds are illustrated in Plate I (full color) of article by Meier and McCloy in Vol. II (1936) and also in Plate I of this article. In photographing the subject's production, a laboratory-constructed illumination-meter consisting of a box measuring 14" by 12" by 8" made light-proof, except for a small peep-hole at one end and a half-inch vertical slit at the opposite end. Over this slit were pasted in successive layers 20 sheets of onion-skin paper, each sheet one-half inch shorter than the preceding one so that when the slit was viewed through the peep-hole, 20 different degrees of opacity were discernible. These were numbered from one to twenty. A sliding piece of cardboard with a half-inch square opening was attached over the slit so that but one square inch could be seen at a time. To use the apparatus, the box was pointed toward the source of light and the sliding piece of cardboard moved from the darkened portion of the slit until a number was clearly visible at the peep-hole. This number was thus designated as the illumination of the set. By making relative adjustments to previously determined exposure times, the approximately correct exposure for any given illumination could be determined.<sup>4</sup>

*IV. Procedure.* The subject seated himself at the control board with the demonstration model in the apparatus. The function of each control switch and auto-transformer was carefully explained and demonstrated in turn with the subject trying them at will. Each color used as filters was shown on the set to indicate the many color effects obtainable; likewise, was shown also the dimmers and filters of the background projection unit. The subject was urged to try out as many different effects as he desired and to take as much time as he needed to become perfectly familiar with the apparatus. In instances where hesitancy or timidity were in evidence, the investigator demonstrated several possibilities before urging the subject to take over the controls. No subject began his own compositions until it was evident that

<sup>4</sup> It was found by trial that the Weston meter was not sensitive enough for the very restricted illumination. (Western Universal, Model 650.)

he was thoroughly familiar with all the details of the apparatus and confident of his handling of it.

When ready, the following instructions were offered: "I am going to put a series of arrangements similar to this on the stage and I want you to arrange the lights and colors until you get the effect you like best." The investigator proffered his services in the case of small children and timid adults in adjusting the colors and placement of spot lights when the subject made the request and indicated how he wanted it arranged. Nothing, however, was done which would prevent the final results from being an individual contribution.

The series of six sets used in this experiment for each subject was designed so that the situation increased gradually in complexity. In the preliminary groups, no further instructions other than those mentioned above were given. The first two sets, No. 1 and No. 2, were decidedly similar in the problem involved in that in both the background remained, on instruction, the same, and both were simple landscapes. The second, however, presented a more difficult lighting problem in that without satisfactory color and light arrangement, no appearance of depth could be achieved and there was a disturbing element of inadequate scale. For the last four sets, backgrounds were selected by the subject from a selected group of 25, largely consisting of landscapes. These were put in the Delineascope by the experimenter and moved about according to the instructions from the subject. Set No. 4 required a more complex emotional interpretation in its grotesquerie but was included in the landscape category.

In the second half of the test, the problem was complicated by the addition of movable elements to be placed by the subject where he thought they would look best. Each movable figure was placed in a forward corner by the experimenter as instructions were given, to be sure that the subject would make some attempt to place it satisfactorily. In group No. 5, the problem of lighting was simplified by the use of colored figures (made of clay and colored with showcard colors) and involved but one free figure. No. 6 involved but one movable figure also, but the figures were again colorless gray clay. Group No. 7 involved

a similar problem with the addition of an extra movable figure as well as an extra group of fixed figures, making a doubly complex creative situation.

The procedure was revised slightly after the preliminary work and several substitutions were made. The practice period and instructions were the same and set No. X and No. 1 were employed as before. No. 3, however, was substituted for No. 2 and the situation was made specific by requiring the subject to attempt to achieve the effect of a stormy day or night. No changes of background were permitted, however, except for change of color and intensity, further complicating the situation in that more of the effect had to be achieved through exact use of colors and lights. No changes were made for No. 4 and No. 5, each being of such a nature intrinsically that a certain type of treatment was more or less necessary. For No. 6 a change of instructions was made; the subject was told to make the set express "Revenge" as well as possible, thus stressing the emotional aspect of the situation more than the compositional. No. 8 was substituted for No. 7 to allow more freedom of compositional handling; the subject was permitted to eliminate as many as two figures, permitting a group of two, three, or four figures in the final selection. No definite instructions were given, however.

The following method of recording was used for this situation: the time for the completion of each set was recorded; the readings on the dials of the auto-transformers (measured in volts), the colors used, and the placement and direction of each of the five spotlights were noted. The illumination of the set was measured by the meter devised for this purpose. The method of procedure employed by the subject was noted during the experiment and checked by brief questioning. The subject was asked to name each completed arrangement in an attempt to check on his approach to the situation and see whether the stress was placed on compositional or emotional elements, etc. An evaluation of the color harmony and appropriateness was made by the experimenter and a black and white photograph was taken with the Leica camera using Panatomic films to insure as accurate

recording values as possible. This whole procedure was repeated for each group employed.

*V. Method of Evaluation.* The procedure adopted for evaluating the compositions was as follows: each variable of the apparatus which is involved in the process of evaluation was isolated and evaluated alone, thus impersonalizing the process as much as possible. The variables are the following:

1. Arrangement and use of light and shade.
2. Arrangement of figures (omitted for landscape).
3. Background selection.
  - a. Appropriateness.
  - b. Linear and tone value.
4. Originality.
  - a. Compositional arrangement.
  - b. Emotional interpretation.
5. Color.
  - a. Harmony.
  - b. Appropriateness in background.

The first four categories were evaluated from the black and white photographs by a jury of selected judges, while the last item was recorded by the investigator at the time of the experiment. The use of colored lights from yellow light sources makes it relatively difficult to achieve an unpleasant composition, since a warmth pervaded almost all of the compositions. The judges received the following instructions: first, from each of these photographs rate each item (variable) on a scale from 10 (perfect) to zero (failure). When this has been done rank the photographs of each set in order of preference. This latter process provided a check on the consistency of each judges' evaluation as well as giving both an absolute and a relative judgment on each photograph.

The nine judges were selected because of their experience in the field of art, either in creative work, psychology, or teaching, and because of their familiarity with the problems involved in such evaluations. Each picture was rated and ranked by three of them, but, in order to avoid the factor of fatigue, no one judge evaluated the entire set of 187 photographs, the number varying from 30 to 144 per judge.

*VI. Reliability.* The "reliability" of the judges' evaluation for each set of pictures was obtained by treating the average intercorrelations of three judges on both rating and ranking, each with each other one, by the Spearman-Brown Prophecy Formula, thus obtaining an approximation of the relative reliability or predictive consistency of the sum of the three ratings. As a further check, the averages of the ratings were ranked and were correlated with the averages of the rankings, making a total of seven correlations for each set of pictures.

These correlations (Table I) reveal an unexpectedly high consistency especially in the ratings, considering the nature of the material evaluated and the divergent tastes of the judges selected for this purpose. A large number of the lower correlations, particularly in the rankings, indicate less agreement than was actually the case, since with so few cases, one extreme disagreement lowered the correlation unduly. These isolated radical disagreements were due largely to the differences in artistic viewpoint among the judges, some preferring bizarre effects while others were more content with academic excellency. The fact that several viewpoints were represented might tend to make the results more significant in that with six different pictures per subject, these extremes tend to average up, indicating that no constant bias is operating. This is partially substantiated by the high correlation between the ranked averages of the rating and the judges' averages of the ranking despite a few low inter-correlations.

The averages of the ratings alone were used for the most part in comparative analysis since they furnished more complete comparable records, as well as correlating highly with the averages of the rankings.

*VII. Results.* The results of the evaluation show definitely that the use of the creative composition apparatus under the given test situation differentiates creative abilities among a group of talented and untalented subjects of all ages (Table II). Perhaps the most significant result is the fact that the differentiation does not seem to be based on age, technical skill, training, or general

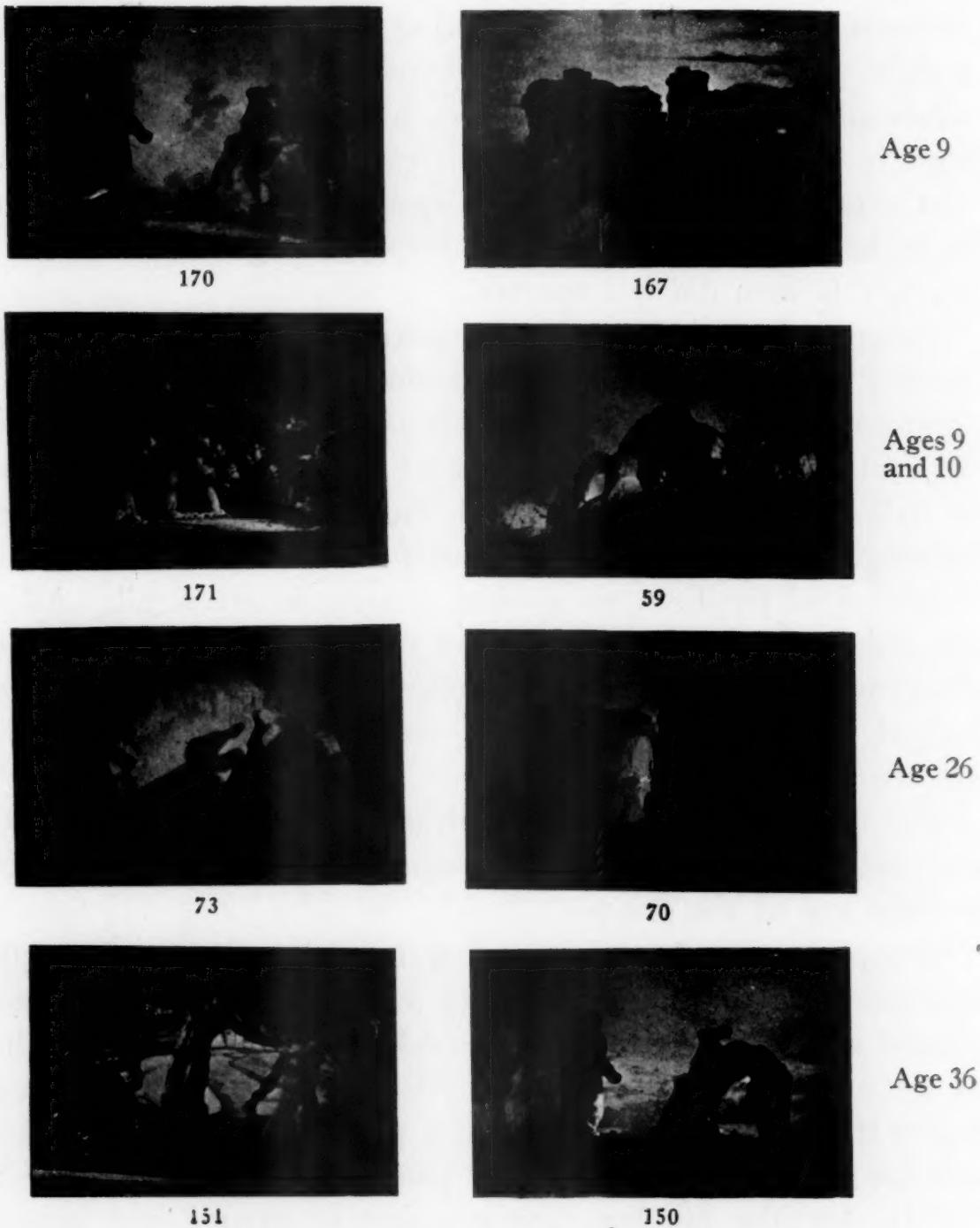
TABLE I. Reliability of judges' ratings

Set	Number of Photographs (33)	Reliability of Averages				Correlations between Average Rankings of Rank and Ratings			
		Judges	Correlations	Judges	Correlations	JH-MB	MB-MV	JH-MV	r=.879±.026
1.		JH-MB MB-MV JH-MV	r=.496±.087 r=.343±.103 r=.536±.083 Av.=.458 * S.U.=.713			r=.588±.080 r=.467±.096 r=.658±.069 Av.=.571 S.U.=.790			
2.	(10)	JH-EC MV-EC JH-MV	r=.860±.055 r=.824±.07 r=.214±.21 Av.=.633 S.U.=.837	JH-EC MV-EC JH-MV		r=.852±.067 r=.717±.108 r=.457±.176 Av.=.675 S.U.=.861			r=.794±.083
3.	(22)	JH-McC KK-McC JH-KK	r=.519±.102 r=.364±.125 r=.520±.107 Av.=.468 S.U.=.725	JH-McC KK-McC JH-KK		r=.115±.144 r=.063±.145 r=.136±.143 Av.=.105 S.U.=.260			r=.517±.107
4.	(32)	RK-McC RK-EC EC-McC	r=.552±.082 r=.553±.032 r=.564±.08 Av.=.556 S.U.=.790	RK-McC RK-EC EC-McC		r=.618±.077 r=.188±.121 r=.447±.101 Av.=.418 S.U.=.683			r=.823±.038

\* S.U.= "Stepped Up" by the Spearman-Brown Prophecy Formula.

TABLE I—C *Continued*

Set	Number of Photographs (30)	Reliability of Averages	Correlations between Average Rankings of Rank and Ratings		
			Judges	GE-MB GE-MV MV-MB	Judges GE-MB GE-MV MV-MB
5.					$r = .794 \pm .044$
6.	(31)				
					$r = .927 \pm .018$
7.	(10)				
					$r = .618 \pm .131$
8.	(19)				
					$r = .861 \pm .044$



**PLATE I.** Compositions made by subjects varying in age from 9 to 36 years. Numbers 170, 167, and 171 were all made by a 9-year-old boy without art training. His average time for these and other compositions was 5 minutes and 7 seconds, his rank among 36 subjects was 10 (1 being highest). Number 59 was made by a 10-year-old girl whose average time was 7 minutes 8 seconds, with little training and with a rank of 31. Numbers 70 and 73 were made by a 26-year-old Psychology of Art Ph.D. whose average time was 24 minutes and 8 seconds and was placed in rank 2. Numbers 150 and 151 were made by a 36-year-old woman, mother of the 9-year-old boy, taking an average time of 13 minutes and 1 second, having had little training and placed in rank 13. The mother and child come from a stock which represents craftsman ancestry. All of these four subjects illustrate the lack of correlation with age and with training since none of these subjects have had any training in the formal production of art.

interests. (Plate I.) In correlating average ratings with ages, a slight positive correlation was found ( $r=.246 \pm .105$ ;  $N=34$ ) ; when all subjects below 12 years of age were eliminated the positive correlation disappeared ( $r=-.169 \pm .24$ ) suggesting that except in isolated cases, the apparatus was too complicated to be handled adequately by the younger subjects, but after 12 years, this item did not operate.

Examination of the order of ranking reveals this above fact further as well as the fact that training does not operate as a significant determining factor. Of the first ten, five have been highly trained in theory and three of these are practicing artists as well. However, the other five, including the first, or highest ranking, have had little or no artistic training; and, with the exception of the first, no avowed interest in art at all. All of the artistically trained subjects are ranked in the upper half of the group and are arranged in general in the order of merit as judged from number of exhibits, teachers' reports, and general art records.

The fact that those subjects with little art training consistently are ranked low probably has no significance because of the low average age of the group.

Grouping the subjects according to training shows that the average score for those trained in psychology of art, including several artists, is slightly higher ( $AM=.64.1$ ;  $N=7$ ) than that of the artists alone ( $AM=.63.1$ ;  $N=4$ ) ; both of these average higher than the untrained group as a whole ( $AM=.56.1$ ;  $N=16$ ) and the group of slightly trained younger subjects ( $AM=.55.5$ ;  $N=9$ ), but the numbers are too few to permit any general conclusions.

The procedure used by each subject was noted in order to determine if possible any definite method was employed by the more creative persons. These procedures classified themselves logically into seven groups as follows (I) there were three subjects who, upon seeing the presented clay forms, formed definite concepts of how it was to appear before proceeding with the actual manipulation process, and worked directly to achieve these concepts in physical form; (II) a larger group, eight in number,

TABLE II. Subjects' ratings on creative achievement

Subjects	Age	Sex	Av. Time	Illumination	Procedure Type <sup>1</sup>	Order of Total Rank <sup>2</sup>	Av. Rating	Order of Rating	Artistic Background <sup>3</sup>
AJ	15	F	16.8	10.4	III	1	75.3	1	D
VM	26	M	24.8	6.0	II	4	70.5	2	B
HJ	25	M	11.7	5.8	II	3	69.6	3	A
BM	24	F	9.0	8.8	III	2	69.5	4	A
SG	13	F	7.9	8.8	III	4	66.8	5	D
KK	27	F	15.6	6.0	III	8	66.7	6	A
PC	12	F	10.4	10.3	II	8	62.8	7	D
SD	12	F	26.4	6.0	III	15	61.3	8	D
BW	25	M	14.0	4.7	I	6	60.5	9	A
SB	9	M	5.7	11.7	III	12	58.8	10	D
WG	13	F	9.5	9.5	VI	11	57.6	11	B
BG	29	M	17.3	7.0	I	16	57.5	12	C
SM	36	F	13.1	9.8	III	7	57.1	13	D
AM	20	F	13.4	11.5	II	22	54.9	14	A
SV	15	F	10.1	8.4	II	22	53.7	15	D
FE	28	M	18.0	12.0	I	24	52.9	16	C
FB	12	F	9.6	8.0	II	13	52.3	17	C
BB	9	M	6.4	—	—	26	51.6	18	C
GB	23	F	7.3	13.3	VI	28	50.9	19	C
RJ	9	M	2.8	—	V	31	50.5	20	C

<sup>1</sup> See pages 98 and 101 for description.<sup>2</sup> Sets Nos. 1, 4, 5, 6 only.<sup>3</sup> A—Both practical and theoretical training.

B—Training in psychology of art.

C—Little training

D—No training.

TABLE II—Continued

Subjects	Age	Sex	Av. Time	Av. Illumination	Procedure Type	Order of Total Rank	Av. Rating	Order of Artistic Background
GD	25	M	25.2	10.8	VII	19	50.5	D
FD	42	F	23.3	8.0	IV	10	50.3	D
NB	11	M	3.1	—	IV	14	50.2	C
WH	21	M	34.7	6.0	VI	18	49.1	D
WL	10	M	8.8	—	IV	20	48.5	C
CE	22	F	10.0	—	IV	32	48.5	B
MF	17	M	19.6	9.3	I	26	48.3	D
MR	21	M	16.2	9.7	II	24	47.9	C
PD	14	F	8.1	—	III	21	47.5	C
ZB	9	M	2.9	—	V	17	46.9	C
PE	10	F	7.8	—	—	29	44.9	C
DV	8	F	7.6	—	—	34	44.5	C
MM	10	M	7.9	—	—	29	37.9	C
WE	7	M	5.9	—	—	33	34.7	C
AM	<hr/> 17.8		<hr/> 12.7±.82		AM	<hr/> 54.0±1.1		
σ	<hr/> 8.5		<hr/> 7.4		σ	<hr/> 9.6		

underwent a brief trial and error experimental period before selecting any one path of development, but after selecting their concept, worked directly for it; (III) the third group of seven worked more or less continuously in one direction but at no time was a single definite goal in sight; the final result "evolved" from a narrow range of trials and errors; (IV) two of the younger subjects were satisfied with the end results; (V) two of the younger subjects were satisfied with entirely accidental arrangements; (VI) three subjects worked very patiently and carefully but changed ideas often, never seeming to be able to make a final decision even though many satisfactory solutions were achieved; (VII) for one subject, so many different methods were employed that no definite procedure type could be ascribed.

The averages of the ratings for these groups are as follows:

Group (I)	53.9	Group (V)	48.7
Group (II)	58.0	Group (VI)	52.7
Group (III)	65.1	Group (VII)	50.5
Group (IV)	49.0		

It is to be noted that six of the first ten are in the third group, while but one of the artists worked in that manner. The other four are divided between the first two categories.

The average rating was correlated with the average time per set to determine whether the time factor, as related perhaps to the difficulties of the apparatus, was an appreciable influence. However, this was apparently an insignificant item ( $r=.246 \pm .105$ ), although a slight positive correlation was found, again due undoubtedly to the results of the youngest subjects.

To check the theory that talented subjects prefer or require less obvious structure delineation, the average score was correlated with the average illumination reading. Although a significant correlation was found ( $r= -.366 \pm .117$ ), suggesting that there was some tendency for the higher ranking subjects to prefer darker pictures, this does not tell the whole tale, for detail might be obscured and a subtle arrangement achieved with relatively brilliant illumination, as recorded by the meter.

To determine whether definite instructions were an assistance or a hindrance, the mean of each of the six sets of the second group was found:

No. 1=59.8±1.82 $\sigma=13.25$	No. 5=56.3±1.2 $\sigma=8.0$
No. 3=64.9±12.8 $\sigma=12.3$	No. 6=55.23±3.0 $\sigma=18.4$
No. 4=54.9±2.39 $\sigma=16.2$	No. 8=54.9±2.61 $\sigma=2.61$

(It will be recalled that a definite goal was assigned Groups No. 3 and No. 6.)

The mean of No. 3 is 4.1 points higher than the mean of the highest group; the PE diff., however, is but 1.78 which does not make the difference significant. It would naturally be expected, however, that a higher mean would be found with such specific instructions as were given. In the other case, No. 6, no difference is noticed at all.

*VIII. Conclusions.* By means of an apparatus described elsewhere, permitting the subject to manipulate colors and movable accessories involving the play of colored light upon clay forms and the introduction of backgrounds, active creative imagination in children and adults was studied. The apparatus eliminates or reduces the factors of training, technical ability, special interests and fatigue. The results indicate that creative ability may be measured in the products obtained by means of such an apparatus. By the keeping of records and photographically reproducing the created compositions, a collection of the person's efforts may be evaluated in their totality. The apparatus furthermore permits the study of procedures followed by subjects in evolving the ensuing composition. With the subjects used, six different procedures were differentiated.

The following additional observations seem justifiable within the limits set by the small number of subjects.

1. Creative ability as measured under these conditions bears no relationship to chronological age after twelve years.
2. The artistic merit of the composition has no bearing on the amount of time used in its creation.
3. Creative ability under these circumstances does not seem to be closely related to artistic training or art interest, since the best performance was made by an untrained subject.
4. There is a slight but significant tendency for the high ranked subjects to prefer less brilliant illumination.

## PASSIVE CREATIVE IMAGINATION

by

WILLIAM McCLOY

*I. Introduction.* It may be assumed that the experience of evaluating properly the work of another calls out abilities very similar to those functioning in active creative imagination or the process of constructing a composition oneself. A second procedure was projected in which the experimenter organized compositions by means of the creative composition apparatus,<sup>1</sup> photographing these compositions on Dufay color film, mounting them on stereopticon slides and then presenting them by projecting the image on to a screen in front of subjects. In the situation following the subject reacts to the composition before him by selecting the best and the poorest from the four compositions giving his reasons for each choice and then attempting to identify the prevailing mood from the list of fifty adjectives supplied on the recording form. Each of the four color photographs represents a variation of the same subject-matter, altered in color and lighting, each quite different from the others in general character despite the similarity of the basic forms (see Plate I in the article referred to in footnote 1). From the total number of compositions made, seven were selected by a jury of artists and art-psychologists as best suited for these purposes. Each judge ranked the pictures on each slide in order of excellence as complete compositions and assigned to each picture an adjective which best defined its mood or emotional tone from the others. From such reports an evaluation scale was formed, and a list of 50 adjectives which included all the meanings assigned the 28 pictures.

<sup>1</sup> A part of the research program, "Genetic Studies in Artistic Capacity," using the creative composition apparatus described in *Studies in the Psychology of Art, Volume II*.

*II. Subjects.* All subjects were high school or college grade including 108 students, of which complete records were obtained from 21 negroes (13 boys and 8 girls) and 74 whites (22 boys and 52 girls).

*III. Procedure.* A Bausch & Lomb portable projector was used with a portable beaded screen. Each subject was given a record sheet which contained spaces for reactions to three slides with the list of adjectives on the left side. The subjects were instructed to read over the list noting the general character and alphabetical order. A demonstration slide was then projected and the procedure described in detail: each slide would consist of four separate pictures, alike in form but totally different in color and lighting. First, the four pictures were to be ranked in order of preference and the number corresponding to the position in the ranking put in the quarter of the rectangle designated as preference that corresponded to the position of the picture on the slide. A brief explanation for the selection of the first and last choice was to be made on the designated place on the blanks. After this was completed, an adjective descriptive of each picture was to be chosen from the list and the number of the adjective in the list put in the quarter of another rectangle designated as mood that corresponded to the position of the picture described. A few blank spaces were left at the bottom of the list for additions of words deemed more fitting by the subject. This process was to be repeated for each of the seven slides. Owing to the perishable nature of the films in heat, each slide was shown for only 30 seconds and removed for 45 seconds and the process repeated five times, making a time of approximately six minutes for each slide. The whole testing lasted about 45 minutes.

*IV. Method of evaluation.* The judges' rankings used in the scoring showed enough scatter among themselves that credit was given for ranking a picture within one place of its assigned position by the judges. If a ranking coincided exactly (one on one, two on two) each right response was given two points; if a ranking was but one from the correct ranking, one point was given (three on two or one on two, etc.). This permitted some

latitude without entire loss of credit. The highest possible score was 56 points.

In addition to the use of the judges' rankings of pictures, their selection of adjectives for each picture was organized into groups of approximately equivalent terms and credit was given for each adjective selection that coincided with one of the groups selected by the judges. In cases where the judges failed to agree sufficiently to be significant, full credit was given for any choice. In this study it was unfortunately true that ten of the twenty-eight possible selections were of such a nature that even qualified judges failed to agree sufficiently to permit any ratings. The group of 50 words was arranged into seven groups as follows:

- I. Words suggesting oppressive unpleasantness.
- II. Words suggesting weirdness and unnaturalness.
- III. Words suggesting emptiness, loneliness, etc.
- IV. Words suggesting quiet peacefulness, etc.
- V. Words suggesting excitement and danger.
- VI. Words suggesting grandeur and strength.
- VII. Words suggesting happiness and sweetness.

The number of different adjectives used was also noted.

The choice of best liked and least liked pictures was checked with the mood ascribed to see whether any consistent mood was chosen for either place. This was also done for boys and girls separately, as well as for negroes and whites. As a final check, the reasons for liking the best and for disliking the poorest were itemized to see if any consistent reasons were given by talented students.

*V. Results.* The following results were obtained from examination of the data:

$$\text{Average ranking score } (N=96) = 27.6 \pm .42 \\ \sigma = 6.18$$

$$\text{Average "mood" rating } (N=95) = 14.3 \pm .21 \\ \sigma = 3.10$$

$$\text{Average total number of descriptive words used} \\ (N=96) = 18.5 \pm .21 \\ \sigma = 3.09$$

$r$  between ranking score and total score on abstract slides =  $-.008 \pm .068$

$r$  between ranking score and number of words chosen =  $.392 \pm .058$

$r$  between total score (abstract slides) and number of words chosen =  $.123 \pm .066$

$r$  between rating on word choice and number of words chosen =  $.372 \pm .059$

## Percentage of choices in each class of descriptive words.

	<i>First Choice</i>				
	Negro Girls	Negro Boys	White Girls	White Boys	Average
I	9	16	10	16	15
II	16	12	22	20	18
III	4	4	4	3	4
IV	42	31	29	25	32
V	0	4	10	8	6
VI	24	28	23	24	25
VII	4	5	3	3	4

	<i>Last Choice</i>				
	Negro Girls	Negro Boys	White Girls	White Boys	Average
I	29	29	23	21	26
II	21	27	25	25	25
III	19	16	22	30	20
IV	14	14	13	15	14
V	6	2	6	4	5
VI	9	8	10	4	8
VII	2	2	1	1	2

The following classifications show the percentage of types of reasons for choosing a picture as either best or worst:

<i>Best:</i>	Color	32%
	Mood	19%
	Compositional reasons	14%
	Clearness	12%
	Shading	11%
	Naturalism	6%
	Miscellaneous	6%
		100%

<i>Worst:</i>	Color	25%
	Monotony	19%
	Mood	15%
	Indistinctness	15%
	Lighting	11%
	Composition	9%
	Miscellaneous	9%
		100%

*VI. Conclusions.* (1) There appears to be a tendency among the subjects studied to prefer calm peaceful pictures with grandeur and magnificence second choice. (2) Oppressive and

unnatural pictures are most disliked with lonely empty pictures a second choice. (3) Judgment of pictures among talented subjects appeared to be based more on general reactions than on compositional analysis. Apparently the process involved in responding to abstract compositions is not closely related with the process used in ranking pictures in order of excellence. (4) No significant sex or race differences were disclosed.

## RE-CREATIVE IMAGINATION<sup>1</sup>

by

WILLIAM McCLOY AND NORMAN C. MEIER

*I. Introduction.* Because the direct study of active creative imagination presents many difficulties it was believed that an indirect approach might be feasible. In serious art, creative imagination is more than a process merely of bringing together in an effective compositional unity personally conceived and manipulated material. Art may be at times of interest only to its "creator", but it is not uncommon that art has an appeal based upon material of much wider significance. The picture may be designed to appeal to mankind—at least to some considerable segment. To the extent that the objective is realized does the picture attain greater value and have wider significance, particularly if it touches upon some vital emotion or some vital phase of human experience known to mankind generally.

The creative type artist is not content with serving his own personal foibles and idiosyncrasies, nor in continuing minor variations of a previously-acquired formula. If he is to some degree *en rapport* with life and societal problems, his interest may run to economic and general welfare, or it may be taken up with religious or philosophical interests, or it may be concerned with human virtues. In any case he sees mankind with an understanding eye. His creative projection may run far ahead of available materials. The process of creative imagination may lead him to subsume much experience and knowledge into symbolic or generalized expression. His problem is heavily psychological, because he must preview the effect his symbols will have on an interpreting world.

The socially minded artist may frequently employ symbols, allegorical figures, or stylized forms which require similar expe-

<sup>1</sup> Part of the research program, "Genetic Aspects of Artistic Capacity," sponsored by the Carnegie Foundation for the Advancement of Teaching, with funds from the Carnegie Corporation.

rience on the part of the observer for complete appreciation. A natural question would therefore be raised as to whether the student taking art is more adept in the use of and can better interpret symbols having social reference than the student not taking art courses.

On this theory the present study was projected. Abstractions were chosen as a medium by which the interpretation of symbolic reference might be accomplished. The problem of "solving" abstractions requires recognition or appreciation of the meaningfulness of the elements within the picture. The act of reorganizing such complicated sense data into a logical and satisfactory experiential whole requires several processes: the ability to recognize clues, to form wholes from parts, to perceive relationships, to evaluate relative items on a basis of significance to the whole, to react sympathetically to the purposes of the painting or the presumed objective of the painter.

*II. Materials.* Selection of slides for this purpose involved a number of problems: it was necessary to include slides abstruse enough to make plausible analysis impossible to a certain portion of the subjects and yet have others with enough recognizable units familiar in terms of the experience of all classes and ages. A fairly large collection of slides of abstract paintings was procured from Dr. Franz Stoedtner, Berlin, and a group of 13 selected for experimental work. The list was composed of:

Slide Number	Artist	Picture
Xi	Picasso	The Student
Xii	Severini	The Black Cat
No. 1	Russolo	The Rushing Train
No. 2	Russolo	Revolution
No. 3	Severini	The "Pan-Pan" Dance
No. 4	Carra	The Funeral of the Anarchist "Galli"
No. 5	Boccioni	Departure
No. 6	Van Gogh	Olive Orchard
No. 7	Boccioni	Laughter
No. 8	Boccioni	Tumult of the Streets
No. 9	Feininger	Zelmeroda IV
No. 10	Boccioni	The Apparition (Der Schein-Vision)
No. 11	Heemskerk	Ships in Harbor
No. 12	Chagall	I and the Village
No. 13	Carra	What the Railway Tells Me

Nos Xi and Xii were used entirely for purposes of explanation.

*III. Subjects.* The subjects used in this portion of the investigation were divided into two groups: (1) from Milwaukee junior and senior high schools, and (2) from Nashville and St. Louis high schools and colleges. Since the procedures involved differed slightly for each group, they will be discussed in separate units.

A. The *Milwaukee* group consisted of 79 students (43 boys and 36 girls) from the ages of 9 to 21 with an average age of 15 years. They were selected as outstandingly talented subjects by the office staff of A. G. Pelikan, director of art in the city, on the basis of past work. Though some did not seem to classify as advanced students; the majority had definitely shown a measure of creative talent in the field of fine or applied art. IQ's were available on 71 of the group; the average was 107 with a range from 78 to 139.

The fifteen slides listed above were all used in this group although, for the larger proportion of the subjects, eleven only were completed. These were projected by standard slide projectors. The subjects' responses were secured on specially prepared recording blanks, designed partly along lines of the Stinson appreciation study and, therefore, contained several questions not pertinent entirely to this study. However, these were minimized in the scoring system and a separate check was made on imaginative items alone.

*IV. Procedure.* The subjects were seated in a dark room in positions affording each subject a clear and undistorted view of the screen. Approximately 10 subjects were tested at a time, permitting fairly close attention to all questions and individual needs. Each subject was given one recording blank for each picture. They were instructed to do their best to answer each question on the sheet fully but briefly. The fact that it was their opinions alone that were desired was stressed as well as that there was no matter of right or wrong to be considered. They were assured that declaring the painting of no significance would have no effect on school marks at all; that an honest answer alone was important. Explanations were urged for each opinion advanced.

At this point practice slide No. Xi was shown and the group asked to give opinions as to what it was about and to discuss it among themselves. The individual questions of the recording sheet were gone over one by one to clarify the meaning of each. This procedure was repeated with slide No. XII.

It was here explained also that the questions were to be filled out in order; that when Part 3f was reached the subject was to raise his hand and the name the artist ascribed to his painting would be put in the blank left for that purpose. In other words, the first part of the test was concerned with the subject's individual interpretation with no aids whatsoever, while the second half examined whether the subject could grasp and explain the significance of the painting after the theme was known.

The test proceeded by showing each slide until every subject was completely through, there being no time limit allotted. As many slides were shown as time allowed, eight being recorded for the larger proportion of the group.

*V. Method of evaluation.* The test blank was divided into eight separate question groups and each group assigned a value as may be seen in the accompanying diagram. Each person's scores were evaluated in two ways. Each paper was first completely graded, item by item, using the following scale:

Evaluation guide

**Group I**

- A. 2 Yes
- 1 Indifferent
- 0 No
- B. 0 No answer
- 1 Stereotyped generalities (It's pretty, etc.)
- 2
- 3 Compositional generalities
- 4 Fair appreciation of action or composition
- 5
- 6 Complete compositional or ideational analysis
- 7

**Group II**

- 0 No answer
- 1 Naming of detail
- 2 Weak generalization
- 3
- 4 Good analysis of composition or idea
- 5 Appreciation of idea and composition

**Group III**

- 0 No answer
- 1 Vague generalization or weak compositional ideas
- 2
- 3 Recognition of details only
- 4 Recognition but no appreciation of idea
- 5 Some appreciation but no emphasis of idea
- 6 Correct analysis inadequately explained
- 7 Complete appropriate and appreciative analysis

**Group IV****Title**

- 1 Based on superficial generalization
- 2 Based on isolated details
- 3 Recognition but no appreciation of idea
- 4 Appreciation but no emphasis
- 5 Amplified and appropriate title

**Group V**

- 1 Vague answer (subject-matter, etc.)
- 2 Over simplified generalizations
- 3 Adequate generalization of compositional analysis
- 4
- 5 Partially accurate and appreciative compositional analysis
- 6
- 7 Amplified compositional analysis

**Group VI**

- 0 No answer—or “can’t see it at all”
- 1 Mere acquiescence
- 2 Acceptance with illogical exception taken
- 3 Mere factual explanation
- 4 Appreciation of artist’s intent
- 5

**Group VII**

- 1 Vague generalization
- 2 Stereotyped logical response
- 3
- 4 Compositional or ideational analysis
- 5

**Group VIII**

- 1 Confusion, puzzlement, etc.
- 2 Repetition of title with no insight
- 3 Stereotyped response
- 4 Good *rappro*rt, well explained
- 5

It is to be noted that full credit was given for a plausible imaginative response. Agreement with the artist’s title was not essential.

The totals from all record blanks were averaged and the single score used as an index of the individual's status.

For the second score, records of the slides of the more definitely abstract paintings (Nos. 2, 5, 7, 8, 9, 10, 13) were separately treated and the scores of sections 3 and 3a (Group III) and 3b (Group IV) were isolated, averaged and converted into percentages. This process was repeated for all slides together. Both groups were then averaged and the percentage resulting was designated as the imagination score of the individual. It is to be noted that the scores of the more difficult slides were given double consideration in the evaluation. While the actual checking of papers was done by one person, *E*, the scale used was examined and checked and as rigidly followed as possible.

Other data recorded were chronological age, IQ, and Meier-Seashore Art Judgment Test scores.<sup>2</sup>

*IV. Results.* The following results were found from the examination of the data:

$$\text{Average total score } (N=79)=20.2 \pm .60 \\ \sigma=5.92$$

$$\text{Average score on slides 2, 5, 7, 8, 9, 10, and 13 } (N=79)=18.5 \pm .49 \\ \sigma=6.32$$

$$\text{Average total score for girls } (N=36)=21.8 \pm .66 \\ \sigma=5.86$$

$$\text{Average total score for boys } (N=40)=18.9 \pm .63 \\ \sigma=5.94$$

$$\text{Average imagination score } (N=79)=48.9 \pm .12 \\ \sigma=15.45$$

$$\text{Average imagination score for girls } (N=36)=49.8 \pm 1.86 \\ \sigma=16.6$$

$$\text{Average imagination score for boys } (N=40)=48.1 \pm 1.53 \\ \sigma=14.4$$

The following relations to intelligence and art judgment were found:

$$r \text{ between IQ and total score } (N=67)=.22 \pm .08$$

$$r \text{ between IQ and imagination scores } (N=67)=.02 \pm .08$$

$$r \text{ between total score and Meier-Seashore test } (N=37)=-.13 \pm .11$$

$$r \text{ between C. A. and total score } (N=79)=.37 \pm .07$$

$$r \text{ between total score and imagination score } (N=79)=.73 \pm .04$$

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<sup>2</sup> The IQ and Meier-Seashore Art Judgment Test scores were obtained by Dr. Carolyn Tiebout; in Part II by Ellen J. Cahalan.

*VII. Conclusions.* An examination of these data would indicate: (1) that the imagination quality measured by these tests is present to some degree in normal talented subjects in approximately a normal distribution; (2) that this quality bears little or no relationship to chronological age ( $r=.37 \pm .11$ ) except in the younger years, where a slight significant correlation may be found; (3) that there is little or no sex difference, the girls averaging but a point or so higher; (4) that this quality showed no relationship with aesthetic judgment as measured by the Meier-Seashore Art Judgment Test with 37 subjects; and (5) that there is no significant relationship between IQ and ability to solve the given situation either for the total situation or with the imagination scores.

B. The *Nashville-St. Louis* group consisted of 115 students, 22 from colleges and the remainder from high schools. Thirty-two of the 115 were Negroes with an average age, (18.2), slightly higher than that of the whites (17.0). In all these were 60 white and 14 Negro girls, and 23 white and 18 Negro boys. This group was selected by their art teachers as being those students who had evinced most talent in art.

*Materials.* The materials used consisted of a standard slide projector, a portable screen, revised recording blanks and eight slides, Nos. XI and 7, and Nos. 1, 2, 3, 8, 5, 4: those found most useful from the Milwaukee data.

The first two were used for purposes of instruction only. Slides 2, 5, and 8, regarded as considerably more abstract were classified as one group (referred to in the results under *imagination scores*), while the others, semi-realistic, were classified as another. The recording blank here used was concerned only with imagination elements, and paralleled roughly the imagination elements of the previous test situation. The first half was concerned with the subject's unaided interpretation, the second part with his further insight upon learning the artist's title.

*Procedure.* The procedure paralleled exactly that of the previous study, except that more subjects were handled at one time.

*Method of evaluation.* The method of evaluation coincided closely with that of the previous study. Each record was divided

into two sections, before and after learning the artist's title, and was evaluated from the following scale:

Evaluation guide

**Group I**

- 0 No idea
- 1-2 Weak generalizations of composition
- 3-4 Illogical combination of details
- 5-6-7 Recognition but no appreciation
- 8-9-10 Some appreciation without stress
- 11-12-13 Correct or imaginative response without adequate amplification
- 14-15 Amplified appropriate and appreciative analysis

**Group II**

- 0 No answer—no concept
- 1 Mere acquiescence
- 2 Acceptance with unappreciative exception taken
- 3 Factual explanation
- 4-5 Appreciation and analysis of artist's intent

Each paper was then rated in percentages for purposes of comparison.

*Results.* From these data the following results were obtained:

$$\text{Average total score } (N=113) = 50.4 \pm .663 \\ \sigma = 10.55$$

**Negroes**

$$\text{Average total score } (N=32) = 48.6 \pm 1.24 \\ \sigma = 10.55$$

$$\text{Average total score for girls } (N=14) = 47.8 \pm 1.51 \\ \sigma = 8.35$$

$$\text{Average total score for boys } (N=18) = 50.3 \pm 1.83 \\ \sigma = 11.3$$

**Whites**

$$\text{Average total score } (N=83) = 50.9 \pm .79 \\ \sigma = 10.6$$

$$\text{Average total score for girls } (N=60) = 50.7 \pm .95 \\ \sigma = 10.9$$

$$\text{Average total score for boys } (N=23) = 51.4 \pm 1.38 \\ \sigma = 9.85$$

**Combined**

$$\text{Average total score for boys } (N=41) = 50.9 \pm 1.13 \\ \sigma = 10.7$$

$$\text{Average total score for girls } (N=74) = 50.2 \pm .775 \\ \sigma = 9.9$$

$$\text{Average total score on slides 2, 5, and 8 } (N=115) = 42.6 \pm .99 \\ \sigma = 15.7$$

The following correlations were obtained.

- r between total score and Meier-Seashore test ( $N=70$ ) =  $.16 \pm .07$
- r between imagination score and Meier-Seashore test ( $N=70$ ) =  $.07 \pm .08$
- r between C.A. and total score ( $N=103$ ) =  $.13 \pm .07$
- r between slides Nos. 2, 5, 8, and 1, 3, 4 ( $N=115$ ) =  $.16 \pm .06$

The distribution of scores is shown graphically on Fig. 1.

*Conclusions.* From these data the following conclusions may be drawn: (1) Again a more or less normal distribution is found, as shown in Fig. 1. (2) No significant correlation may be found between C. A. and imagination as measured by this test. (3) No significant sex differences are in evidence. (4) No significant correlation was found between aesthetic judgment as measured by the Meier-Seashore test and imagination. (5) No significant racial difference was found between Negroes and whites. (6) Correlation between the results on abstract slides and the semi-realistic slides was extremely slight.

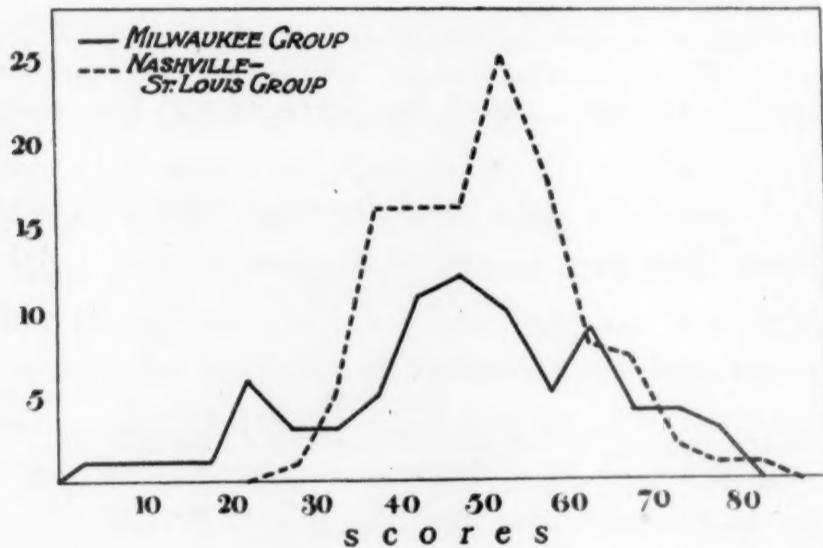


FIG. 1. Showing comparison of the distribution of scores for the Milwaukee and the Nashville-St. Louis groups.

Inspection of the results discloses that superimposition of the curves of distribution of both groups shows a decided skewing on the lower ranges in the Milwaukee group not found in the second set of data. This may be ascribed to one of three factors: (1) irregular selection of subjects, (2) the lower age limits of group one, despite the insignificant correlations with C. A., (3) the possible inclusion of untalented subjects as explained under *Subjects* in the Milwaukee group. As yet, however, without testing a larger group of unselected and definitely untalented subjects, no final conclusion on this point can be drawn.

## RECONSTRUCTIVE IMAGINATION<sup>1</sup>

by

NORMAN C. MEIER

*I. Introduction.* As a further approach to the investigation of the processes involved in aesthetic imagination, a procedure was devised for leading the subject through progressive stages of perceptual advancement, with the principal objective of ascertaining whether the art student would profit earlier from the supplied items than would a non-art person. The thesis rests upon the assumption that the artistically trained individual would discern likeness or contrast, relationships of item to context or element to the picture theme, more readily than would the non-art subject. There would be assumed furthermore a greater familiarity with social themes, with symbols of civilization, with expressive content in sculpture or paintings, and similar powers wherein the artist-type might be expected to excel. In using the term 'artist', however, it is frankly conceded that such an expectation of powers would probably be the possession of a relatively few superior individuals.

The procedure was worked out in two divisions—the first used abstract or semi-abstract paintings, and the second used paintings and works of sculpture of various kinds.<sup>2</sup> The materials in part two were for the most part less complex and were used chiefly for expressive or thematic content. By progressive perception is meant control over the process of perception to the end that the experimenter guides the subject's attention throughout. The subject is led through three stages of perceiving during which he has his attention directed to items making up the composition with the opportunity presented at five stages for giving an interpretative title or characterization of the picture before him which in all cases is abstract or semi-abstract and in most respects

<sup>1</sup> A part of the research program Genetic Studies in Artistic Capacity.

<sup>2</sup> Used in the form of reproductions on stereopticon slides.

is outside the experience of the subject. The abstraction when first viewed usually meets with no response except bafflement. By supplying in turn a direction of the attention to significant items in the composition opportunity is provided for more and more possibilities of perception. The initial blocking is hence progressively removed and the way prepared for a complete perception at the end of the process.

*II. Procedure.* Two distinct methods of presentation and recording responses were employed. The progressive perception procedure led the subjects through three stages of progressive aid. Counting the initial response and the concluding reactions, it affords five opportunities to give an interpretative title to the picture. The specific procedure is as follows:

Each subject is provided with a mimeographed blank on which he is to record five title attempts and a variety of interpretative and perceptual identifications of parts or elements in the composition. As soon as the slide is thrown on the screen the subject is asked to write on line 1 any interpretation of the composition that comes to mind. If after about one minute no title is forthcoming the experimenter passes to the first series of item identification. As the experimenter points to each item in turn (a, b, c, etc.) (for example note Plate I and areas indicated in Fig. 1), the subject writes in his idea of what it is. Then, when this series is complete he is asked to glance over the list, noting what each is and after considering them collectively, to write in a title. This may be the same as he placed on line 1 or it may be different.

After a pause of one to two minutes, the experimenter dictated to subjects what he thinks the same items are: these are entered in the middle group of lines (a, b, c, etc.). After these are entered the same process is repeated as above, allowing one to two minutes for a third attempt at a title.

The experimenter then dictates a second list, this time the symbolic nature of the same eight items, followed by inspection and entering of title (fourth opportunity).

*After this is done and admonition given for avoiding any writ-*

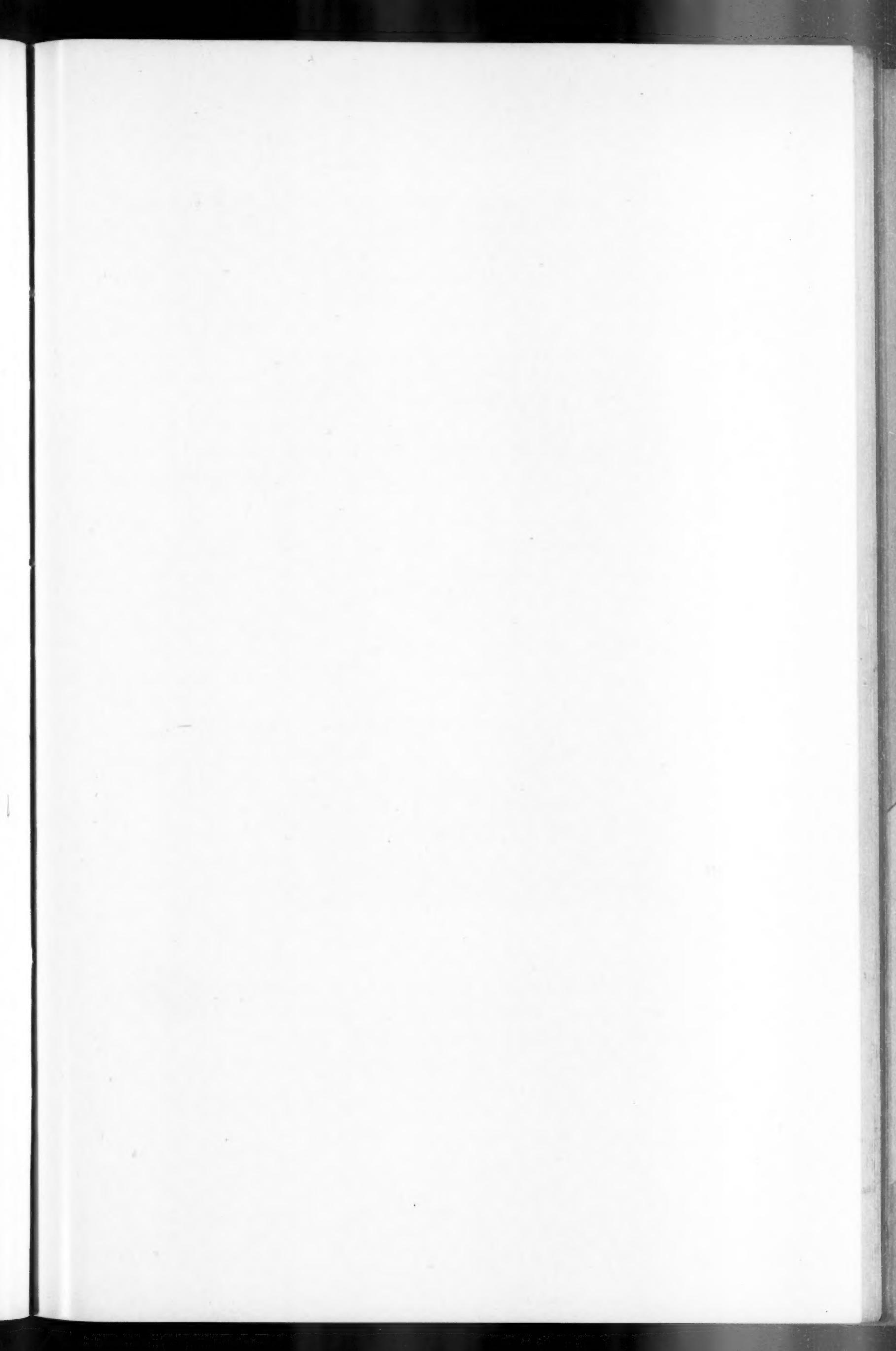
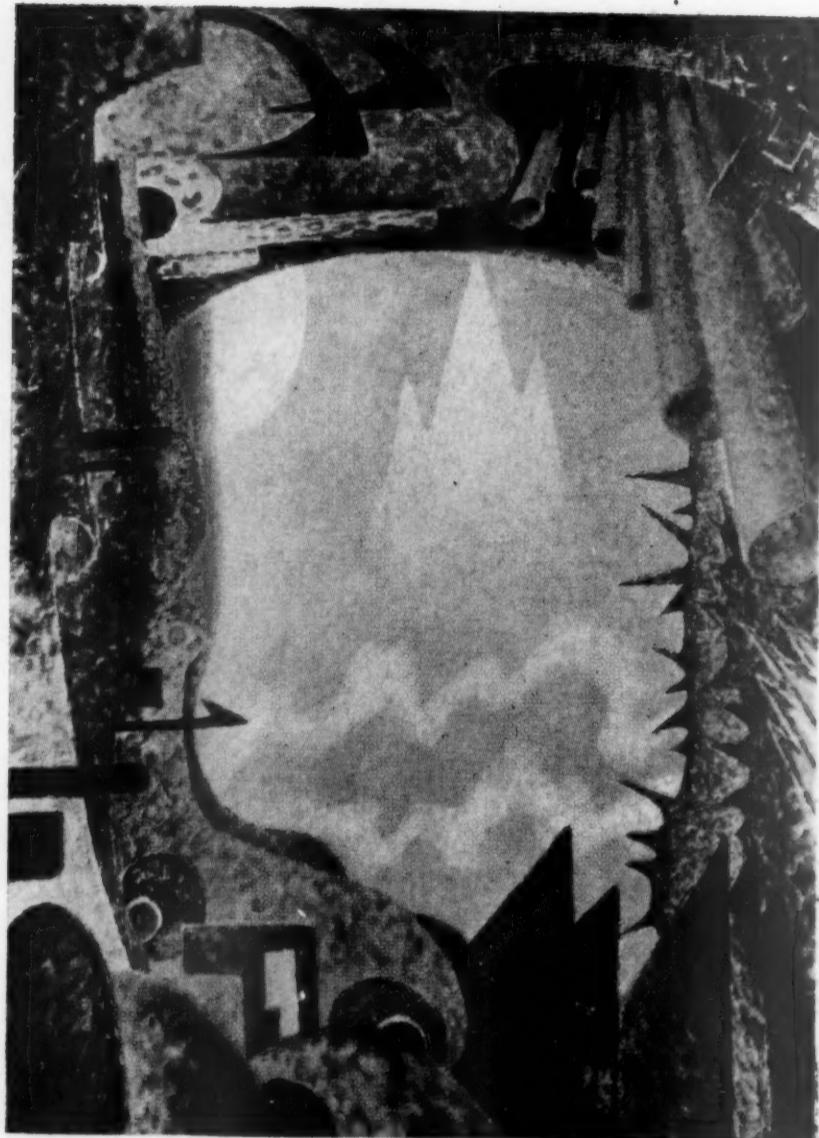


PLATE I



COURTESY RUDOLF LESCH FINE ARTS, INC., N. Y. C.



ing in spaces above, the painter's title is supplied with the request to evaluate it.

The blank used in No. 27 (Temple of Eternity) is reproduced in part below. It will be noted that the subject fills in line (1) on first seeing the picture, and then fills in blanks (a) to (h)

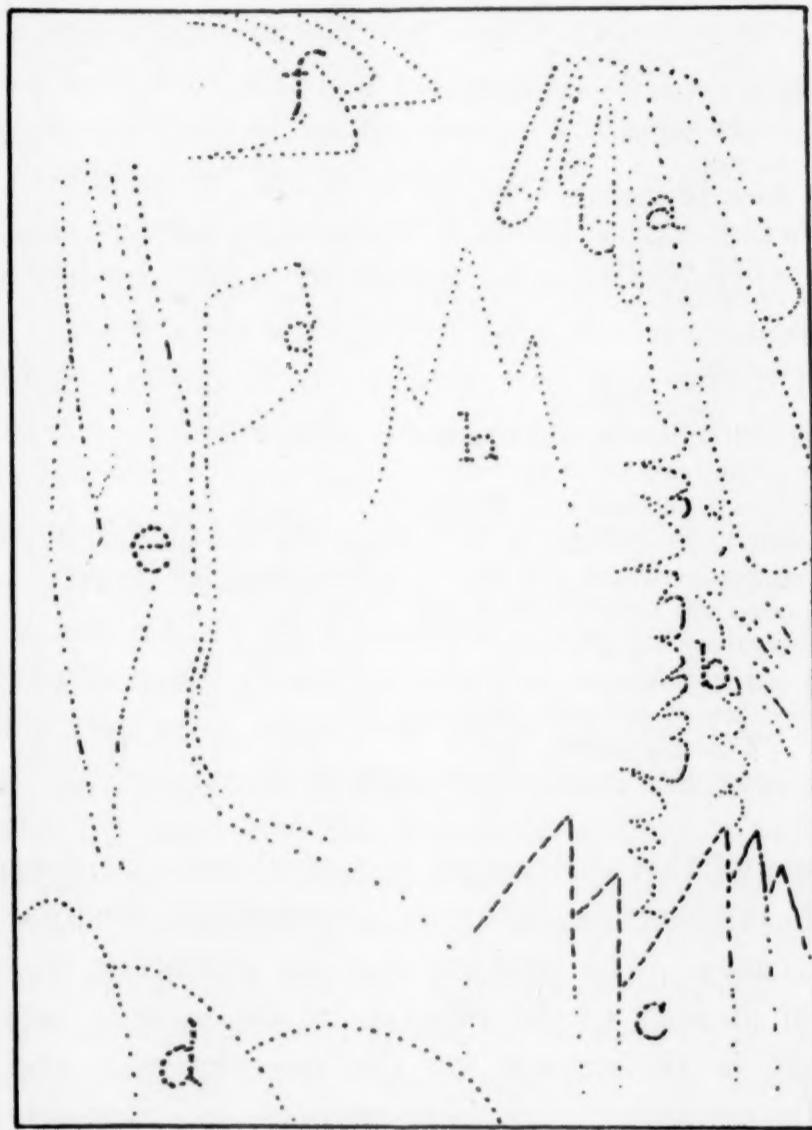


FIG. 1

inclusive as they are in turn pointed out by the experimenter. At section (4) the experimenter dictates the list supplied, each being written in by the subjects. The same procedure occurs at (6). There are halts at (1), (3), (5), (7) and (8) for inserting titles if any occur at these junctures.

- (1) Title suggested . . . . .
- 1. Suggested identity of elements
  - a. . . . .
  - b. . . . .
  - c. . . . .
- (2) d. . . . .
- e. . . . .
- f. . . . .
- g. . . . .
- h. . . . .
- (3)      Title suggested . . . . .
- 2. Literal identity of elements
  - a—organ pipes . . . . .
  - b—thorns . . . . .
  - c—mineral crystals . . . . .
  - d—cells . . . . .
  - e—ocean swells . . . . .
  - f—swallows . . . . .
  - g—sun . . . . .
  - h—temple . . . . .
- (4)      Title suggested . . . . .
- 3. Symbolic identity of elements
  - a—symbol of religious music . . . . .
  - b—crown of thorns—Christianity . . . . .
  - c—inanimate nature . . . . .
  - d—organic nature . . . . .
  - e—ceaseless motion—time and tides . . . . .
  - f—mystery—oracle . . . . .
  - g—sun worship . . . . .
  - h—edifice of religious worship . . . . .
- (5)      Title suggested . . . . .
- 4. Proposed title . . . . . Temple of Eternity . . . . .

The theme of this abstraction is a synthesis of the symbols of objects of religious significance throughout history and in prehistoric times. The problem for the subject is to note first the apparent identity of the elements in the picture, secondly the identity that is understood by the experimenter and, thirdly the symbolic significance of these elements as interpreted by the experimenter.<sup>3</sup>

<sup>3</sup> This picture was painted by the German-Swiss philosopher-artist, Joseph Schneiderfranken of Lugano, Switzerland, who adopted the mystic name of Bo-Yin-Ra. Correspondence with Mr. Schneiderfranken verifies in the main the investigator's interpretations and the symbolic significance of the elements as listed above. It is contended that for the purposes of research it is not wholly essential that the interpretation be identical in every respect with that of the painter since the *general* symbolic significance is all that can be expected from a subject. The reader is referred to two publications that treat of this abstraction and its painter. Rudolf Schott, *Der Maler Bo-Yin-Ra* (München, Franz Hanfstaengl, 1927) and Bo-Yin-Ra, *Aus Meiner Malerwerkstatt*, Basel-Leipzig, Kober'sche Verlagebuchhandlung, 1932.

All of the pictures in both series were of a type that would permit a reaction of deep and penetrating character or one of a superficial or surface interpretation. For instance Nolde's *Krieg* could be superficially interpreted as "horse race" or "cavalry charge" or it might have an intermediate interpretation such as "On to battle". An interpretation which would show insight into the purposes of the painter would include reference to the brutality or horror of war. It will be seen that a variable scoring system could be devised on the basis of degree of adequacy of the insight shown by the subject. Some required a knowledge of emotional expression, others of social forces and movements, others of history, others of aspects of nature not ordinarily considered. Fifteen were used in this part of the study but because the knowledge required of subjects was believed to be too specialized in ten of the fifteen, those were omitted from the final scoring.

Another example of the interpretative procedure may be illustrated by Grant Wood's, *Daughters of Revolution*. Pointed out to the subjects in turn are: the three women; the contrast between the smooth, glazed, pinkish surfaces of the skin in the faces, and the cold, slate-blue tone of the reproduction of Leutze's, *Washington Crossing the Delaware*; the manner of holding the tea cup; and the lace-work collars. This is a necessary preliminary step towards sensing the purpose of the artist in so choosing his color themes, and towards comprehending the satire which then might become apparent to the subject—namely, that of contrasting the life of ease enjoyed by these women with the hardships suffered by ancestors five or six generations removed.<sup>4</sup> Complete insight will add to this the questionable assumption of the privilege of pronouncing judgment upon any and everyone merely on the basis of blood connection.

The first procedure provides for a progressive insight into the painter's theme and theoretically should aid the subject in coming progressively closer to it at each succeeding stage.

The second procedure differed in that only the five most significant features of the picture were pointed out, the idea being

<sup>4</sup> The above interpretation of this picture was verified by Mr. Wood and is used with his permission.

merely to ensure perception of the picture by attention to its significant parts.

*III. Materials.* The preliminary work included Bo-Yin-Ra's *Temple of Eternity* and a few other abstractions or semi-abstractions. In the final selections there were seven abstractions or expressive pictures for the progressive-perception technique and the abbreviated technique. The list is as follows:

*Progressive procedure*

- 21 Boccioni, Der Abschied
- 22 Hoeckner, Machine Age
- 23 Van Gogh, Cypress Tree
- 24 Boccioni, Die Macht der Strasse
- 25 Hoeckner, Contemporary Rhythms
- 26 Boccioni, Scheinvision
- 27 Bo-Yin-Ra, Temple of Eternity

*Interpretative procedure*

- 1 Nolde, Krieg
- 2 Barlach, Head
- 3 Hoeckner, Light
- 4 Russolo, Die rassende Zug
- 5 Wood, Daughters of Revolution

*Also used, but data incomplete*

- 6 Hoeckner, Machine Age
- 7 Barlach, The Abandoned
- 8 Van Gogh, Grainfield
- 9 Russolo, Revolution
- 10 Dove, Running Dogs
- 11 V. Higgins, Spring Rains
- 12 McCutcheon, The Light of Learning

Eleven of the slides were obtained from the collection of Dr. Franz Stoedtner of Berlin. The others were from various sources. The Hoeckner slides and interpretations were obtained from the artist himself and hand colored by the Art Institute of Chicago. Most of the preliminary work was made on Bo-Yin-Ra's *Temple of Eternity* and a few other abstractions.

*IV. Method of scoring.* As indicated earlier the scoring must of necessity be to some extent subjective, which may admit some degree of error. The use of uniform specification for each response category, however, served to keep this likelihood of error down to a minimum, and provided a basis for repetition of the performance with other subjects. Instructions to the subjects

were kept constant by reference to a separate list of items for each picture. The plan is outlined on a preceding page with reference to Picture No. 27 (*Temple of Eternity*). Some modifications of this general plan were necessitated by different types of material, but a given procedure once adopted was maintained for all subjects.

In the instance of No. 27 ten points were awarded if the subject sensed the meaning of the composition at once. This rarely happened with any subject, though some immediate interpretations were judged to be fair approximations and were scored accordingly if later responses tended to confirm it. One point was awarded (up to a maximum of five) for each correctly identified element in Stage One (2).<sup>5</sup> For a correct title at conclusion of Stage One (3) eight points are given. At end of Stage Two (5) five points are allowed and at conclusion of Stage Three (7) only three points are allowed. One or more points might be added if the comments point definitely to a complete interpretation.

While the scoring system may seem complicated, it is based simply on the principle of awarding a maximum for immediate perception and a descending scale of values in accordance with the amount of aid given, at subsequent stages.

As a further move in the direction of objectivity, typical responses over a considerable sample of the total group were written down and then classified on a zero to ten scale. These were translated into descriptive statements or categories so that final scores could then proceed with reference to the entire range of the group. Each response sheet was then re-scored on this basis. As typical of the scoring framework, items for No. 27, Bo-Yin-Ra, *Temple* are given below. The statements at right are from the record sheets of subjects.

10 (Abstracted 9 Generalization)	Ceaseless wave of religion—Temple of Eternity—Religious worship—Sources of religion—Religions of mankind
8 (Idea of recurrent 7 religious motif)	Theologic phantasy—Temple of Peace (or 6, 5)—Sources of Christianity—Eternal Life (or 9)—Everlasting reverence for the unknown

<sup>5</sup> The reference is in the outline of procedure on earlier page.

6 (Time and nature; 5 Religion—nonspecific; Man's evolution)	Man and Nature—Eternity—Heaven (or 7) Creation—Worship of Nature (or 7)—Kingdom of God—Beauty of religion
4 (Non-specific 3 Life; Time; Life and Death)	Beginning of Time—Nature—The Universe— Our Christian Life—Cycle of Life—Peace— Hope
2 (Vague symbols)	The world. Birth of Life (or 3, 4).
1	Humanity—Church—A Symphony
0 (Irrelevant generality)	Bewilderment—'Crazy Quilt'

Four scores were obtained: the average score for the group on immediate response; the critical response score, at the point following the stage where the subject has had significant items brought to his attention; a total score of all points throughout all stages of the perceptual process; and the percent indicative of the degree to which the critical score exceeds the initial score. The scoring of the Interpretative Series was likewise based upon a sliding scale of values, made out with reference both to the painter's own known thesis and typical attempts of the subjects. As illustrative of the scoring framework for the series the following was adopted for the Grant Wood, *Daughters of Revolution*:

- 5 Satire: contrasting Washington (hardship and privation) with women in comfortable apartment, yet basking in glory of remote ancestry.
- 4 Contrast hardship and luxury, but failure to see full point as in (5).
- 3 Generalized observation but not conclusive, as "Life then—life today".
- 2 Imaginative situation, reasonable but not specific as "Ladies Chatting" or "Sewing Circle".
- 1 Non-specific and more or less inapplicable reference.

In actual practice it was found that owing chiefly to the relative immaturity of the subjects (high school students) the higher scores were infrequent.

*V. Subjects.* The subjects are divided into two groups: "high school art students" or "high school non-art". The former were simply enrolled in art classes at the time the study was made; the latter were several classes in commercial subjects and mathematics. This selective plan does not provide assurance that the first group are all talented in art nor that there might be some who have potential talent in the 'non-art' group. The selection was made primarily on the basis of availability.

*VI. Results.* By scoring each subject's eight record-sheets on the basis outlined above, the results presented in Table I and II were found.

TABLE I. *Initial, critical and total response scores—progressive perception procedure*

A. *High school art group*

Picture No.	N	IR *	CR	TS	C>I
21	141	1.64	3.84	10.15	.67
22	148	3.89	3.98	10.00	.51
23	115	1.34	1.57	6.67	.40
24	118	1.50	6.72	9.91	.88
25	143	2.46	3.61	8.46	.60
26	140	1.77	4.54	10.15	.68
27	177	.49	4.07	6.20	.88

\* IR—Initial response.

CR—Critical response.

TS—Total scores.

C>I—Critical greater than Initial.

All values are arithmetic means except C>I which is in percent.

B. *High school non-art group*

Picture No.	N	IR	CR	TS	C>I
21	41	.88	3.00	6.66	.68
22	45	3.56	3.15	9.24	.42
23	66	1.30	.86	4.15	.21
24	51	1.06	6.55	7.92	.88
25	50	1.02	3.25	6.46	.60
26	48	1.83	3.48	7.70	.60
27	72	.28	2.72	4.85	.70

TABLE II. *Interpretative responses*

Picture No.	H. S. Art Students		H. S. Non-art Students	
	N	Score *	N	Score
1	149	3.48	55	1.87
2	149	2.30	55	1.67
3	149	2.23	55	1.14
4	127	1.43	55	0.35
5	127	1.43	55	1.05

\* Arithmetic means.

Inspection of the data reveals a definitely greater response after the perceptual experience is consummated over the initial contact response. Since the TS value in each case is still larger there is indicated an expanding perceptual progress which suggests a play of contributory elements before the final CR is

attained.<sup>6</sup> The procedure was therefore successful in enhancing perception under guidance.

In comparing the scores of the two groups it is evident that on general performance the art group is superior to the non-art group. The superiority is not pronounced in a few instances and in a few others the superiority is reversed.<sup>7</sup>

*VII. Conclusions.* This study was projected primarily as an exploratory one to test the thesis that insight into the perceptual processes of art and non-art subjects could be arrived at by leading the subject through a devious process of successively more and more adequate contact with the elements making up the composition. Although some of the materials were extremely complicated the procedure was reasonably successful as a technique.

Differences were disclosed between the two groups—art and non-art—even though the criteria of selection was rather unsatisfactory. The results are sufficient to warrant further study both in problems of perception and in the diagnosis of artistic aptitude.

<sup>6</sup> Repetitions of the same idea were not considered in the scoring; only new and reasonably distinct advances were credited. The same title given for all stages was thus credited only for the initial response. Because of this the divergence of CR over IR is greater than it appears.

<sup>7</sup> It is planned to extend this study in connection with work on a projected creative imagination test; hence it was not deemed necessary to carry out the statistical analysis further.

## THE EFFECT OF LECTURES ON ART PRINCIPLES UPON ART PRODUCTION AT THE FIFTH AND SIXTH GRADE LEVELS<sup>1</sup>

by

LUELLA RAAB MUNDEL

*I. Introduction.* It is assumed that the mature artist may paint pictures that have aesthetic qualities, without knowledge of the principles involved or familiarity with the terminology of aesthetics; his work being governed by an intuitive insight. But it is perhaps an equally tenable position that with definite knowledge of these principles the artist has an even better assurance of producing pictures of merit.

Children may also have an intuitive grasp of aesthetics; but their efforts are, probably, largely dependent upon chance and feeling. The object of this study is to provide information bearing on the question: Are children of the intermediate grades capable of understanding aesthetic principles, as conceived by adults, and, if so, to what extent does such knowledge condition their creative effort?

*II. Procedure and subjects.* In 1936, two groups of twenty-five children each, matched for intelligence, chronological age, mental age, and aesthetic judgment means, were selected from grades five and six in Iowa City parochial schools<sup>2</sup> for an art training period covering, roughly, two school years.

The classes met on alternate days for two half-hour periods, weekly. During the first year, both groups were scheduled for

<sup>1</sup> An investigation in the research program, Genetic Studies in Artistic Capacity, directed by Dr. Norman C. Meier and sponsored by the Carnegie Foundation for the Advancement of Teaching with financial aid from the Carnegie Corporation. This study received aid also from the Spelman Fund through coöoperative arrangements with the Iowa Child Welfare Research Station.

<sup>2</sup> Acknowledgment is made to the Sisters of Charity and to Father Neuzil, Iowa City, Iowa, for their coöperation in this study.

3 P.M.; but during the second year, the control group met at 3:30 P.M. Experimental and control groups were taken after regular school hours starting with the second half of the first year, and the beginning of the second year, respectively.

Training in the experimental group (X) was of two types: Approximately fifty minutes each week, comprising sixty-two meetings, were allotted to free illustration with choice of media (chalks, charcoal, colored papers, or modeling clay), and to assigned problems and media planned to entail the use of art principles. Ten minutes each week were devoted to a total of twenty-four lectures over art principles, illustrated by diagrams, advertising layouts, large color prints, and slides. Lectures were not related to specific classroom work; and no mention of art principles was made aside from lectures.

As an aid to teaching, unfamiliar material in paired items, exemplifying effective use and misuse of principles, was presented to both groups at convenient intervals. When the X group did not show a significant gain in comparison to the C group, instruction was repeated with different examples.

Training in the C group was identical to that of the X group with the exception of the ten-minute lectures.<sup>3</sup>

*III. Technique of measurement.* To measure the change in aesthetic insight, within and between groups, the Iowa Aesthetic Choice Test was administered by delineascope projection at the beginning and end of both years.<sup>4</sup> And to measure the change in art production samples of tempera and fingerpainting were collected from each subject at these points in the experiment. At each testing period, the subjects were directed to choose, from a list of forty-nine stories,<sup>5</sup> any three incidents which they wished to illustrate in tempera. Instructions were restricted to the technique of mixing paints and keeping clear colors.

Powder tempera in red, blue, green, yellow, violet, orange, black, white, and brown; white book stock paper, 16"x22";

<sup>3</sup> The lecture themes and all illustrative material are on file in the Psychology of Art division of the Psychology Department at Iowa City.

<sup>4</sup> Described in article by Saunders, Aulus W. The stability of artistic aptitude at the childhood level. *Psychol. Monog.*, 1936, **48**, No. 2, 139.

<sup>5</sup> Fifth and Sixth Grade Story List, Phillips School, Des Moines, Iowa.

easel brushes; easels and drawing boards were provided in a well-lighted room, large enough to permit placing easels so that one child could not readily see the work of another.

As an additional measure, three productions in fingerpaint, a medium which requires little technical skill and which lends itself more feasibly to design than to illustration, were done by

TABLE I, A. *Data on subjects*

	Kuhlmann-Anderson (4th ed.)	Chronological Age			Mental Age					
		Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls
AM	(X)	105.0	105.2	104.7	10-7*	10-9	10-6	11-1	11-3	10-11
	(C)	103.4	100.1	105.2	10-6	10-8	10-6	10-11	10-8	11-0
MD	(X)	105.5	104.0	106.0	10-8	10-8	10-5	11-2	11-3	11-0
	(C)	105.0	101.5	105.0	10-8	10-8	10-5	10-9	10-9	10-10
SD	(X)	10.1	11.9	8.4	10.3	9.2	11.0	10.0	8.0	11.5
	(C)	11.5	16.3	10.1	6.7	5.7	6.6	14.6	17.0	12.9
Range	(X)	42.0	42.0	24.0	38.0	31.0	38.0	35.0	29.0	34.0
	(C)	46.0	42.0	42.0	29.0	20.0	25.0	60.0	54.0	58.0
#	(X)	25.0	13.0	12.0	25.0	13.0	12.0	25.0	13.0	12.0
	(C)	25.0	9.0	16.0	25.0	9.0	16.0	25.0	9.0	16.0
Critical Ratio		.52			.41			.57		

\* Read: 10 years-7 months.

TABLE I, B. *Division of time*

Total Practice Periods.....			62
Total Lecture Periods.....			24
Absences:			
Practice Periods (X)	AM	Mdn	Range
Practice Periods (C)	4.9	4.0	11.0
Lecture Periods (X)	1.3	2.0	4.0

(X)—Experimental group.  
(C)—Control group.

each subject at the beginning and end of the period of instruction. One fingerpainting by each subject was considered sufficient at the end of the first and beginning of the second year. The children were allowed to paint anything they wished in this medium; and, again, instructions were confined to technique.

Paintings were in monotone; but with a choice of any one of the following: red, green, blue, brown, or black pigment on 16"x22" white enamel paper.

Following the investigation, tempera and fingerpaintings were rated by ten competent judges,<sup>6</sup> on an eleven and seven point scale respectively.

#### Directions for Judging Tempera Paintings

This group of paintings, done by children, is to be judged on the basis of effectiveness of aesthetic organization. Technical ability should be given but little weight. Symbols on the backs of paintings are entirely arbitrary.

When the judging is complete, there are to be eleven piles, with approximately equal steps *between* piles; the first pile being the worst, or lowest, with a rating of .5, and the eleventh pile being the best, or highest, with a rating of 5.5.

To facilitate judging, go through roughly half of the paintings, once, to gain a general idea of the average quality of the work. Then go through the entire group, again, placing the paintings in three piles: good, medium, and poor. Subdivide each of these three piles into three more, having nine divisions in all. From the lowest of the nine piles take out the poorest paintings; and from the highest of the nine piles take out the best paintings. This will result in the required eleven piles.

Directions for judging fingerpaintings were the same as those given above for tempera, except that fingerpaintings were rated on a seven point scale, as follows:

To facilitate judging, go through roughly half of the paintings, once, to gain a general idea of the average quality of the work. Then go through the entire group, again, placing the paintings in three piles: good, medium, and poor. Subdivide the medium pile into three piles, the good pile into two piles, and the poor pile into two piles. This will result in the required seven piles.

Correlation of the scores of half the judges with the remaining half resulted in  $r=.88 \pm .01$  for tempera painting, and  $r=.83 \pm .02$  for fingerpainting. Using the Spearman-Brown Prophecy Formula for double the number of cases, an  $r$  of .94 and  $r$  of .91 were obtained for tempera and fingerpainting, respectively.

*IV. Analysis of aesthetic judgment.* As measured by the Iowa Aesthetic Choice Test, aesthetic judgment showed no statistically significant differences, either between groups, or within the same group over a two-year period. A tendency, however, for the C group to improve by a probably significant amount from the first to the fourth test; and a slight regression for the X group on the same tests are to be noted in Tables II and III.

<sup>6</sup> Judges were: five teachers of art from the Des Moines, Iowa, school system, one art teacher from the University Elementary School, Iowa City, and four graduate art students from the University of Iowa, who had previous experience with children's work.

IQ, CA and MA means were too closely matched to influence the results, appreciably; but sex was evidently a factor in favor of the improvement of Group C which included fifteen girls and nine boys to twelve girls and thirteen boys in Group X. When sex differences were discounted, lectures in Group X appear to have had a negligible effect upon aesthetic judgment. (Tables II and III.)

TABLE II, A. *Iowa aesthetic choice scores*

		Total Groups				(X) Girls and (C) Boys			
		AC1	AC2	AC3	AC4	AC1	AC2	AC3	AC4
AM	(X)	41.1	42.1	40.6	40.7	40.2	44.0	42.3	42.7
	(C)	39.1	40.8	39.7	41.8	38.7	39.2	38.3	40.1
MD	(X)	41.0	43.0	42.0	41.5	41.0	45.0	43.5	43.0
	(C)	39.0	41.0	40.0	43.0	39.0	39.0	37.0	40.0
SD	(X)	4.8	5.3	4.5	4.9	3.9	2.2	3.2	3.8
	(C)	3.8	4.0	4.3	4.0	3.8	5.0	4.9	3.9
Range	(X)	22.0	21.0	18.0	20.0	14.0	7.0	12.0	14.0
	(C)	16.0	17.0	18.0	13.0	13.0	17.0	16.0	11.0
#	(X)	25.0	25.0	25.0	25.0	12.0	12.0	12.0	12.0
	(C)	25.0	25.0	25.0	25.0	9.0	9.0	9.0	9.0

TABLE II, B. *Group results in aesthetic preference tests*

	From AC1 to AC4 % of Subjects Showing:		
	Gain	Loss	No Change
Experimental Boys	15.4	61.5	23.1
Experimental Girls	50.0	16.6	33.3
Control Boys	44.4	44.4	11.1
Control Girls	81.3	18.8	0.0
Experimental Group	32.0	40.0	28.0
Control Group	68.0	28.0	4.0

Of the seven items missed by 50 per cent or more of the X subjects on the final presentation of the test, six dealt with articles of clothing, furniture, architectural accessories, or pottery—material not covered by lecture illustrations. Inability to apply art principles in the new situation was therefore indicated. Item # 56, a painting exemplifying a principle covered in similar illustrations from the lectures on Emphasis, was probably missed to such a large extent because of preference for bright color regardless of the violation of an aesthetic principle.

That aesthetic judgment did not improve in the C group over a two year period, as a result of greater chronological age, tends to support the findings of Bulley that aesthetic judgment shows no advance between the ages of eleven and thirteen, and does not become marked until about the age of sixteen (3, 167-68).

TABLE III, A. *Significance of the differences between means (aesthetic choice)*

Critical ratios, total groups			
AC1 X ← 1.63 — AC1 C	.73	1.55	AC2 X ← 1.00 — AC2 C
↓		↓	↑ .07
AC2 X ← 1.00 — AC2 C			↑ .94
AC1 X ← 1.63 — AC1 C	↑ .54	1.54	AC3 X ← .76 — AC3 C
↓		↓	↑ .97
AC3 X ← .76 — AC3 C			↓ .89
AC1 X ← 1.63 — AC1 C	↑ .26	*2.48	AC4 X — .86 → AC4 C
↓		↓	↑ .06
AC4 X — .86 → AC4 C			↓ 1.79
			↓ AC4 X — .86 → AC4 C

TABLE III, B. *Critical ratios, (X) Girls and (C) Boys*

AC1 X ← .89 — AC1 C	*2.94	.24	AC2 X ← *2.70 — AC2 C	↑ 1.53	.39
↓		↓	AC3 X ← *2.14 — AC3 C		
AC2 X ← *2.70 — AC2 C			AC2 X ← *2.70 — AC2 C	↑ 1.04	.43
AC1 X ← .89 — AC1 C	1.45	.18	↓		
↓		↓	AC4 X ← 1.56 — AC4 C		
AC3 X ← *2.14 — AC3 C			AC3 X ← *2.14 — AC3 C	↑ .28	.87
AC1 X ← .89 — AC1 C	1.61	.79	↓		
↓		↓	AC4 X ← 1.56 — AC4 C		
AC4 X ← 1.56 — AC4 C					

\* Probably Significant.

AC1 X ← In favor of the Experimental Group

Since a correlation of only  $.11 \pm .05$  was obtained between the four aesthetic choice scores of the entire fifty subjects and their corresponding tempera test scores, production ability of these subjects could not, in this case, be predicted by the Iowa Aesthetic Choice Test. (Table IV, B.) Either, aesthetic judgment and production are unrelated variables at this age level, or, one or

both of the measuring devices failed to discriminate closely between small differences in ability. In part, validity of the Iowa Aesthetic Choice Test may be reduced by inclusion of materials bearing ideational connotations;<sup>7</sup> variation of more than

TABLE IV, A. *Production with intelligence and age variables*

	Correlation Chart			
	IQ	CA	MA	AC1 Even
T1 (X,C)	.21±.09	.26±.09	*.36±.08	
T1 (X)	-.09±.14			
T2 (X)	.11±.13			
FP1 (X,C)	*.44±.08	.03±.10	*.45±.08	
FP1 (X)	.22±.13			
FP2 (X)	-.08±.14			
AC1 Odd				*.47±.07
# 57				(.64 Spearman-Brown)

TABLE IV, B. *Production, different media*

	Correlation Chart				
	T4 (X RO)	T4 (C RO)	T4 (X)	T4 (C)	T1234 (X, C)
T1 (X RO)	*.46±.11				
T1 (C RO)		*.49±.10			
FP4 (X RO)	.38±.12				
FP4 (C RO)		*.47±.11			
FP4 (X)			.41±.11		
FP4 (C)				.35±.12	
AC1234 (X,C)					.11±.05

\* Probably Significant.

T1234—Tempera Tests: 1, 2, 3, and 4.

FP1234—Fingerpainting Tests: 1, 2, 3, and 4.

RO—Rank Order Correlation. (All other correlations are Ruch-Stoddard.)

one principle in a single pair of examples; and presentation of paired items, mounted so closely together (one-fourth to one-sixteenth of an inch apart) that perception of either item is confused by the other. At present, no Aesthetic Choice Test, satisfactorily adapted to the intermediate age level with high validity exists.

*V. Analysis of aesthetic production.* As with aesthetic judgment, no significant differences were found between the tempera or fingerpainting means, either between groups, or within the same group over a two-year period of training. The X group improved slightly from the first to the fourth set of tempera and

<sup>7</sup> Numbers 23, 51, 52, and 53 deal with articles of clothing; number 39 consists of a pair of chalices, both used in Catholic services.

fingerpaintings, while the C group regressed from the first to fourth tempera sets and improved from the first to fourth finger-painting sets. A "probably significant" difference between the means of groups X and C on the second fingerpainting test may have been due to chance rather than to the influence of lectures on art principles, since only one sample was required of each subject. (Tables V, VI.)

TABLE V, A. *Production scores over the two-year period*

		Tempera Painting Scores			
		T1	T2	T3	T4
AM	(X)	2.16	2.14	2.47	2.27
	(C)	2.40	2.44	2.67	2.35
MD	(X)	2.00	2.07	2.22	2.12
	(C)	2.17	2.40	2.44	2.28
SD	(X)	.59	.61	.75	.72
	(C)	.80	.65	.83	.75
Range	(X)	2.30	2.18	2.83	2.57
	(C)	3.07	2.50	3.44	2.30
#	(X)	25.00	25.00	25.00	25.00
	(C)	25.00	25.00	25.00	25.00
	(X) Boys	2.13			2.14
	(C) Boys	2.44			2.32
	(X) Girls	2.19			2.41
	(C) Girls	2.38			2.37
		AM			

TABLE V, B. *Fingerpainting scores*

		FP1	FP2	FP3	FP4
AM	(X)	3.11	3.69	3.52	3.46
	(C)	2.77	2.83	3.31	3.14
MD	(X)	3.06	3.56	3.66	3.29
	(C)	2.65	2.71	3.03	3.10
SD	(X)	.56	1.33	1.42	.85
	(C)	.71	.96	1.26	1.00
Range	(X)	2.63	4.60	4.60	3.87
	(C)	3.00	4.10	4.50	3.10
	(X) Boys	3.05			3.39
	(C) Boys	2.56			2.50
	(X) Girls	3.09			3.55
	(C) Girls	2.90			3.49
		AM			

Rank order of the fifty subjects on tempera set one and tempera set four indicated stability for X boys, and an improvement in rank for X girls at the expense of C subjects, both boys and girls. (Table VII, A.) Thus, a slight gain for group X and a slight loss for group C, over a two-year period, were found. Both gain and loss were, undoubtedly, due to chance variation.

Rank order of the fifty subjects on fingerpainting showed an

improvement on the part of C girls at the expense of C boys and X subjects. (Table VII, B.) However, C boys offset the total

TABLE VI, A. *Significance of the differences between means (production)*

Tempera Test			
Critical Ratios		Total Groups	
T1 X—1.24→T1 C ↑ .12	↓ .19	T2 X—1.73→T2 C ↓ 1.76	↓ 1.08
T2 X—1.75→T2 C		T3 X—.82→T3 C	
T1 X—1.24→T1 C ↓ 1.68	↓ 1.17	T2 X—1.73→T2 C ↑ .71	↑ .45
T3 X—.82→T3 C		T4 X—.39→T4 C	
T1 X—1.24→T1 C ↓ .60	↑ .23	T3 X—.82→T3 C ↑ .99	↑ 1.43
T4 X—.39→T4 C		T4 X—.39→T4 C	

TABLE VI, B  
Fingerpainting Test

Critical Ratios			
Total Groups			
FP1 X← 1.88—FP1 C ↓ 1.99	↓ .23	FP2 X← *2.63—FP2 C ↑ .44	↓ 1.51
FP2 X← *2.63—FP2 C		FP3 X← .55—FP3 C	
FP1 X← 1.88—FP1 C ↓ 1.31	↓ 1.85	FP2 X← *2.63—FP2 C ↑ .71	↓ 1.11
FP3 X← .55—FP3 C		FP4 X← 1.23—FP4 C	
FP1 X← 1.88—FP1 C ↓ 1.72	↓ 1.48	FP3 X← .55—FP3 C ↑ .16	↑ .53
FP4 X← 1.23—FP4 C		FP4 X← 1.23—FP4 C	

mean gain in the C group, making the amount of improvement practically equal in both X and C groups.

Again, slight sex differences in improvement were revealed. Gains, when they occurred, were due to the girls in the group;

and in no case did girls show as great a loss in aesthetic production as boys of the same group. (Table V, A and B.)

Since IQ, CA, and MA means were not significantly different between groups, and since each of these factors had a low posi-

TABLE VII, A. *Shifts in group production*  
Mean Rank Order on Tempera Painting, Sets 1 and 4

	#	T1	T4		#	T1	T4
(X) Total	25	27.3	25.9	(C) Total	25	23.7	25.1
(X) Boys	13	27.1	27.6	(C) Boys	9	21.8	24.7
(X) Girls	12	27.5	24.1	(C) Girls	16	24.7	25.3

TABLE VII, B  
Mean Rank Order on Fingerpainting, Sets 1 and 4

	#	FP1	FP4		#	FP1	FP4
(X) Total	25	21.5	23.4	(C) Total	25	29.5	27.6
(X) Boys	13	22.3	25.3	(C) Boys	9	34.8	38.6
(X) Girls	12	20.4	21.4	(C) Girls	16	26.4	21.3

TABLE VII, C  
Mean Change in Rank on Tempera Painting, Sets 1 and 4

	Gain	Loss		Gain	Loss
(X) Boys	17.2	15.6	(C) Boys	9.8	16.4
(X) Girls	6.9	10.5	(C) Girls	10.7	9.5

TABLE VII, D

- (X) Boys: 6 move in the same direction on Tempera and Fingerpainting.
- (X) Boys: 7 move in opposite directions on T and FP.
- (X) Girls: 5 move in the same direction on Tempera and Fingerpainting.
- (X) Girls: 7 move in opposite directions on T and FP.
- (C) Boys: 6 move in the same direction on Tempera and Fingerpainting.
- (C) Boys: 3 move in opposite directions on T and FP.
- (C) Girls: 9 move in the same direction on Tempera and Fingerpainting.
- (C) Girls: 7 move in opposite directions on T and FP.

tive correlation with painting scores, they have had no important bearing on the results. Table IV, A.)

*Case studies:* During the first year, the daily work of four of the male subjects in group X was preserved and examined with reference to coincident lectures:

Subject KK: The work of subject KK characteristically exemplified bisymmetrical arrangements, emphasis by centrality of position, and a general lack of variety, despite discussions of more subtle methods of attaining balance and emphasis.

Occasionally, subject KK made use of principles not as yet covered in lectures, *i.e.*, rhythm through size sequence which was not discussed until the second year.

KK regressed in both aesthetic judgment and tempera tests at the end of the first year. (Table VIII.)

TABLE VIII. *Results from case studies*  
(X) Subjects: KK, I, P, and Y

KK				I			
IQ	112			IQ	95		
CA	9-7			CA	11-7		
MA	10-9			MA	10-8		
AC1	-.624	T1	-.276	AC1	.832	T1	-.186
AC2	-2.068	T2	-1.054	AC2	-2.444	T2	.789
AC3	-.444	T3	-.024	AC3	-1.110	T3	.202
AC4	-1.224	T4	-.519	AC4	-1.632	T4	-.1381
P				Y			
IQ	122			IQ	97		
CA	9-6			CA	11-7		
MA	11-7			MA	11-3		
AC1	-.832	T1	-.475	AC1	-3.120	T1	-1.029
AC2	1.504	T2	-.969	AC2	-.376	T2	.230
AC3	.222	T3	-.269	AC3	-.888	T3	.322
AC4	1.020	T4	-.805	AC4	-1.020	T4	-.456

Aesthetic Choice and Tempera Scores are given in Z-Scores.

Subject I: Subject I, at first, achieved either asymmetrical balance or no balance whatever. Until December 17, he was unable to unify his compositions on the horizontal axis; but suddenly succeeded in filling the entire picture space and bringing the top and bottom parts into relationship. This occurred before balance on the horizontal axis was illustrated in lecture periods.

Likewise, on January 12, he drew a well arranged composition attaining emphasis by notan and closure before any lectures on emphasis were given. During and after the series of lectures on balance, the subject frequently violated the principle in his productions.

At the end of the first year, Subject I inconsistently improved on the tempera test and regressed on the Aesthetic Choice Test. (Table VIII.)

Subject P: The compositions of subject P were restricted to bisymmetrical balance, if any, and emphasis through strict centrality despite coincident lectures on balance and emphasis; while sequential arrangements and rhythmic color repetition were produced, sporadically, without the aid of lectures.

Subject P improved considerably in figure drawing and lettering, which were taught during first-year practice periods; and, in general, seems to have benefited more by technical aid than by lectures over art principles.

A large improvement in Aesthetic Choice at the end of the first year, in this case, was accompanied by a drop in aesthetic production. (Table VIII.)

Subject Y: Subject Y, in the beginning, produced haphazard arrangements across the bottom edge of the paper, showing neither balance nor emphasis.

Emphasis by closure, radiation, and superimposition were obtained by the subject prior to their illustration in lectures; while, on the contrary, the subject violated the principle of balance directly after lectures dealing with this principle.

Subject Y gained in both aesthetic judgment and production ability by the end of the first year. (Table VIII.)

Failure of X subjects to apply lecture principles to their work, may be largely ascribed to the fact that their work was never criticized on this basis. As a result, errors in composition were continually repeated and no benefit accrued from occasional good performances.

Moreover, restriction of criticism of the children's work to technical execution, in the practice periods, and criticism of adult art on the basis of aesthetic principles, in the lecture periods, tended to isolate the two types of instruction and to inhibit transfer of aesthetic principles to the children's production.

The lack of improvement in aesthetic production in either the X or C groups, despite the increase in chronological age, is probably attributable to the subjects' more or less uniform level of performance as measured by the scale method. Assuming that the distribution for X subjects on the last tempera test would be of the same general form as the first, with an identical S. D., and that three fourths of the paintings showed marked improvement, these paintings would have to improve .764 scale values, or 1.5 times the S. D., in order for a statistically significant difference to appear between the means. Hence, three fourths of the production of the group, after training, would have to reach a mean level attained by only 7 per cent of the subjects on the first test, or, reach the level of the two highest rating subjects on the first test.

It is obvious, therefore, that the scale method of judging a large number of paintings will show statistically significant differences only in cases of marked change.

#### *VI. General conclusions:*

1. The aesthetic judgment of two groups of children of the intermediate grades, as measured by the Iowa Aesthetic Choice Test, was uninfluenced either by twenty-four, ten-minute lectures on art principles, or by sixty-two, half-hour classes in free illustration.
2. No change in the aesthetic production of either group, as rated by ten judges, resulted either from lectures on art principles, or from classes in free illustration.
3. A low correlation of  $.11 \pm .05$ , obtained between Iowa

Aesthetic Choice scores and corresponding ratings on aesthetic production, made impossible the prediction of one variable from the other.

4. The negative findings are probably attributable to the immaturity of the subjects, both in their inability to grasp and to apply aesthetic principles, and in their more or less uniform level of performance as measured by the scale method, which did not discriminate to fine limits.

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## FACTORS IN ARTISTIC APTITUDE: FINAL SUMMARY OF A TEN-YEAR STUDY OF A SPECIAL ABILITY<sup>1</sup>

by

NORMAN C. MEIER

*I. Introduction.* With passage of time permitting a decade of observation on the same subjects and a wide variety of approaches to test other hypotheses on considerable groups it is now possible to lay down certain observations on the nature of artistic aptitude, which, in the sense that anything in science may be "final", epitomize the complete findings. The principal conclusions rest mainly on the experimental work of research assistants, the case-study records of six talented and six non-talented children and the life histories of forty-one American artists, although much more data enters into specific phases of the findings.

The finding of greatest interest is a new theory of talent which, for the first time, clearly indicates the specific interaction of the inherited aspects of talent with the learned phases. There can be no adequate understanding of artistic aptitude *without both being taken into account*. The view presented herein places the greater emphasis upon heredity, but extreme care must be taken by the reader to note the particular aspect of heredity involved—*constitutional stock inheritance*—not direct inheritance, in the commonly assumed sense, from parents. Only one of the six factors is strongly referable to inheritance—manual skill—yet

<sup>1</sup> The research program, "Genetic Studies in Artistic Capacity," at the University of Iowa, under the author's direction. The various activities referred to include coöperative relations with the public schools of Des Moines, St. Louis, Milwaukee, Nashville, Chicago, and other places. Most of the case studies were made in Iowa City and Des Moines. The program was sponsored by the Spelman Foundation and the Carnegie Foundation for the Advancement of Teaching with funds of the former and of the Carnegie Corporation.

it is to be noted further that three of the other factors are to some degree *conditioned* by heredity: that is to say, their development is at least partially influenced by the peculiar nature of the inherited traits. There is hence presented for the first time a theory (for which there is considerable substantiation) which suggests a unique and peculiar *interlinkage* of factors that exhibit both inherited and acquired characters.

Artistic aptitude is viewed as resting upon the possession of six factors: manual skill or craftsman ability, energy output and perseverance in its discharge, general and aesthetic intelligence, perceptual facility, creative imagination, and aesthetic judgment. It is readily recognized that these are not mutually exclusive categories but are general terms descriptive of a number of recognizable functions which overlap considerably and are not strictly independent variables. In future analyses of mental functions there will no doubt be breakdowns of some of these at least, into more specific and simple functions.<sup>2</sup> Of the six general factors the first three (manual skill, energy-perseveration, and intelligence) refer *primarily* to heredity. The latter three (perceptual facility, creative imagination, and aesthetic judgment) refer principally to acquired nature, but as it will be developed later, are conditioned in their specific development by factors having a definite reference to heredity. This is particularly applicable to perceptual facility and aesthetic judgment, less to creative imagination.

#### THE FACTORS IN APTITUDE

*I. Manual skill.* Obviously no work of art is possible without some manual skill. This ability is regarded as primarily inherited, *but not inherited as a skill* directly from parents. It comes as a phase of general constitutional stock inheritance from a *line of ancestry* which in the individual members may not necessarily include artists but *does include a comparatively large or above average number of individuals having craftsman ability*.

<sup>2</sup> Suggested by the progress made by Thurstone at the University of Chicago and others. Thurstone, *The Vectors of Mind* (1935) and *The Primary Mental Abilities* (1938). Chicago: University of Chicago Press.

The line, traced back through a half-dozen or more generations may have included such occupational interests as toy-making; wood-carving and cabinet making; watch and instrument making; diamond-cutting; textile design and manipulation; jewelry making, repairing or adjusting; or any of the arts; lithography, engraving, drafting and related activities. The essential fact is the craftsman nature of the work, whether it touches upon any of the recognized "arts" or daily occupations such as carpentry or rug-weaving.<sup>3</sup> The following of these occupations successfully by members of a line is *prima facie* evidence that these were individuals *to whom such skill came easily* in their youth. It also denotes that in such regions of the world (*e.g.* Central Europe, Japan) where craftsman activities have long been prominent there was a social selective factor operating in matings that would tend to concentrate and perpetuate the better and (economically) more successful "strains"; the youth who quickly attained economic competence by virtue of his ready acquisition of the needed skill would marry into a family likewise (economically) established.<sup>4</sup>

The heredity involved is simply that of social selection in a consistent direction. Morphological characters alone are involved: the individuals come from stock that is well adapted for work requiring fine eye-hand coöordinations; they transmit on the same characteristics, in some instances reinforced. Each new individual does not come into life with preformed skills; he merely inherits the kind of neuro-physical constitution that is *readily adaptable* to the *acquisition* of such skills.<sup>5</sup> In actual instances

<sup>3</sup> It is to be noted that the distinction between 'fine' and 'applied' art is of comparatively recent origin; in fact the word 'art' carried the connotation of anything well done (shaped, engraved, sculptured, designed) as recently as 1880. Dictionaries prior to that time did not force a distinction between 'artist' and 'artisan'.

<sup>4</sup> This sociological phenomenon has been discussed by Giddings who refers to such concentrations of like-mindedness (more properly here: like-skilled) as 'familial aggregations'. (The medieval household industry and later communal industries of the upper Danubian and Rhineland regions constitute excellent examples.)

<sup>5</sup> From the viewpoint of genetics this is in harmony with the principle of orthogenesis or directional evolution, about which there is no serious question as to principle but only differences of opinion regarding specific manner of functioning (Haldane, to writer).

today it is not expected that clear cases of perfect craftsman ancestry will appear in great numbers, but evidence is consistent in the prevalence of considerable craftsman activities in the ancestry of both artists and the talented children studied.

Perfect craftsman ancestry need not be expected, nor should one look only to gainful employment as evidence of craftsman nature. Since the Industrial Revolution with its de-emphasis upon hand-work and its dissipation of pride in workmanship many a potential craftsman interest has been stifled—in some instances to emerge as an avocational interest.<sup>6</sup> Hobbies are frequently eloquent in indicating deep-seated interests, which for one reason or another cannot become the bread and butter vocation.

Specific evidence of the relation of craftsman ancestry to manual skill is of four types: early appearance in talented children, early appearance in adult established artists, relatively more craftsman activities in ancestry, and the case study of Loran Lockhart.

A small group of children early identified (at ages 4 and 5 years) as exhibiting an interest in drawing, modeling or arranging<sup>7</sup> have now been followed for a period of ten years; likewise a group approximately equal in chronological and mental age who had not at the same initial period shown any interest. Individual cases have been under intermittent observation in Des Moines for about seven years. The Iowa City groups have been reduced slightly by removal from the city but of those still available for record the original classifications have been borne out practically without change.<sup>8</sup> It is of utmost significance that

<sup>6</sup> Witness the surprising interest in home power tools and machines, which permit professional people and business men to indulge their propensity outside of work-day hours, and the well-attended business men's evening art classes in the larger cities.

<sup>7</sup> See *Psychol. Monogr.*, 1933, **45**, No. 200, studies by Grippen, Rodgers and Tiebout. (*Studies in the Psychology of Art*, Vol. I.)

<sup>8</sup> Some of the Z-children (non-talented) subjects in the Saunders experiment were given intensive training over a two-year period. Although that experience resulted in some of the subjects attaining a measure of proficiency, the significant fact is that four years *after* the termination of the experiment and the withdrawal of stimulation those children have not carried on the activity nor demonstrated any continuance of particular interest in art production. (See *Psychol. Monogr.*, 1936, **48**, No. 213. Article by Saunders.)

these children now still exhibit the same high degree of unstimulated interest and high proficiency in production as at any time throughout the period. In the case of the non-talented the interest is still nominal or lacking and the performance average or less.

Among established adult artists only a few failed to recall early artistic endeavors; others were able to lay out for the author's inspection water colors and paintings made during the age of five to eight years. To others less specific in their memory, the expression "as far back as I can remember" was frequently asserted. Only in one instance<sup>9</sup> was the earliest remembered artistic production given as late as sixteen. The other striking fact is that in no instance was the individual's interest and activity urged upon him by an adult.

Information blanks filled out by 283 art students, chiefly in the high schools of St. Louis, disclosed more craftsman activities in recent ancestry (seldom going beyond three generations) than in a group taken at random from classes in commercial subjects and mathematics in the same high schools. Among the art students a total of 358 blood relatives listed such occupations as against 120 for the non-art group; taking the occupations most closely related to art (*e.g.*, engraver, lithographer, etc.) the numbers are respectively 152 as against 37.<sup>10</sup>

In order to test the hypothesis further, a personal data blank was prepared with space provided for checking off the number of craftsmen in the ancestry, listing the following activities—cabinet-maker, carpenter, engraver, weaver, architect, jeweller, lithographer, potter, draftsman, watch repairman, artist, technician—with additional space for any occupation of a craftsman nature not listed, and with provision for hobbies both of the parents and the person addressed, as well as further data on training and future occupational interests, and information to

<sup>9</sup> The late Irving Couse of Taos, New Mexico.

<sup>10</sup> It should be pointed out that these results are on 'art students', that is, high school students taking art courses. The assumption does not follow that they are necessarily *talented* in art. In view of this circumstance it is reasonable to assume that if only the definitely talented were singled out the results would probably be more striking. It is entirely possible also that there are some cases of potential talent among the non-art students.

be supplied by teachers on the subject's ranking in creative ability and in technical ability.

This blank was sent to a number of artists, art students in both private and college art schools, to a limited number in high schools and normal schools and also to a sampling of the general population taken from the high school and college ranks of individuals who have not had any training and have little or no interest in art. A further group of 31 constituting the art staff of a large engraving house was also secured.

It is believed that the great prevalence of craftsmen ancestry among art people would be indicated in at least two ways—first by the proportion of subjects having no craftsmen ancestors whatever and by the average number of craftsmen for the individuals in each group. The results of this survey are given below in Table I.

TABLE I. *Craftsman ancestry of artists, art students and the general population*

General Population			
	N	N (zero)	Ave. N Cr.
Unselected college students	153	36%	2.05
Unselected high school students	23	35%	1.61
Totals	176	35.8%	2.00
Art Population			
Artists (limited sample)	58	15%	3.59
Art students—art schools	282	9%	4.74
Art students—colleges	230	13%	3.98
Art students—h.s. and n.s.	43	13%	4.07
Art staff—engraving firm	31	6%	5.64
Totals	644	11.02%	4.37

N=number of subjects.

N (zero)=number having no known craftsmen in ancestry.

Ave. N. Cr.=average number of known craftsmen in ancestry.

It should be understood that the expectation in these returns would be short of true conditions because of the following conditioning circumstances:

A. Lack of extensive records. Most persons know little of their ancestors beyond three generations.

B. Failure to include true inheritance through female line because activities that are significant in this connection are usually occupationally non-classifiable. For instance, fine embroidery work may

require the same skill as an engraver but would not be classifiable and recorded in this study except in a few instances where the alertness of the subject caused it to be included among hobbies of mother. Hobbies, however, were not tabulated in the totals and in many instances they have decided significance. It is very probable that knowledge of hobbies of ancestors, other than father and mother, would be known in very few instances.

C. Individuals may put varying interpretations upon some occupations as for instance carpenter, jeweler or technician—undoubtedly some were included when they should not have been while others were excluded when they should have been included. The list of craftsman occupations furthermore was not exhaustive.

D. Obscuration of the true occupational interest of the ancestor through necessity to work at more available or in more remunerative activities. A sustaining occupation is enjoyed by relatively few artists. The real interest would show up in hobbies, had that end been explored further and recorded in the data.

TABLE II. *Number of craftsmen in ancestry and average rank in class\**

N. Cr.	Groups		Students—P **		Students—C ***	
	N	Ave. Rank	N	Ave. Rank	N	Ave. Rank
0	21	16.1	29	14.9		
1	21	14.3	30	15.2		
2	29	16.0	26	14.4		
3	25	15.2	23	16.0		
4	21	15.7	25	15.3		
5	25	16.5	24	14.8		
6	16	15.0	15	16.7		
7	7	12.0	5	13.4		
8	8	16.0	6	15.0		
9	8	16.7	6	13.1		
10	8	16.1	3	16.3		
11-31	15	13.5	12	14.2		

\* Rank in both creative and technical ability.

\*\* Private art schools.

\*\*\* College art schools.

In making comparisons between the art groups and general population, however, errors which may creep into the data because of the conditions enumerated will probably cancel since there is no reason to assume that they would not be approximately as prevalent on one side as the other.

The records of several hundred students whose teachers supplied ratings on the basis of standing in the upper tenth, upper third, or average of the class were examined in order to see if a greater number of ancestors accompanied the higher standings. In other words, would persons with ten craftsmen in the ancestry

rank more consistently in the upper tenth of their classes than would students with no craftsmen ancestors. This was done by assigning twenty points for standing in upper tenth in both creative ability and technical ability and values ranging down to ten of the various combinations (10-10, 10-7, 7-7, 7-5, 5-5). The number of students so studied was too limited, however, to draw conclusions from the findings. The averages of the standings of the art students from both the private art school and the college student groups classified on the basis of number of ancestors is shown in Table II.

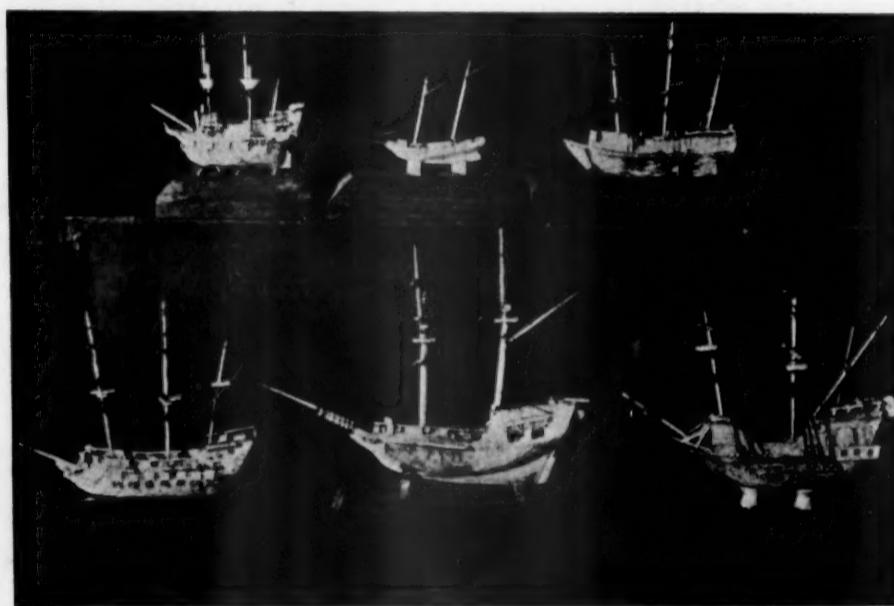


FIG. 1. Current products of subject XAM, illustrating craftsman ancestry. This is the same subject, who, at age six, produced tempera paintings in Volume I [Plate II (a) and (b), Plate III (b)]. He is now 13-2 and has as a present hobby the making of minute ship models, a few of which are illustrated. These are not *assembled* models, but are constructed in every detail from raw materials and are authentic for their periods. The tiny size is not apparent from the photographs. The subject has a river steamboat model scarcely taller than a nickel and a pre-historic animal carved from soap smaller than a dime. This subject is one of the Iowa City group on whom records are complete for a period of ten years.

The above subject has ten known craftsmen in his ancestry. Subject SB in the McCloy study whose compositions made at age 9 and illustrated on Plate I has eleven; as in the case of Loran Lockhart there is no apparent explanation for the precocity save through craftsman stock inheritance.

Apparently at least from the data at hand it is not possible to generalize on the number of craftsmen in a quantitative way.

In the limited high school sampling there is evidence of a slightly higher average number of craftsmen in the superior group as compared to the average (3.73 as against 3.32).

The returns from the nationally known artists were somewhat disappointing because of faulty addresses, a large number of the requests being returned undelivered.<sup>11</sup> The returns while including a number of the country's great artists were lacking in other famous ones. It will be noticed that nine out of the fifty-eight artists reported no craftsmen. An inspection, however, of their record sheets shows that in seven out of these nine the hobbies of parents are distinctly of a craftsman nature, the following being cited as examples: painting (m), weaving (m), photographer (f—artist himself is a portrait painter), gardens (m), mounting of rare birds (f), and wood carving (f). Subsidiary data on the blanks yields other interesting and significant facts that tend to explain some of the instances which statistically do not show craftsmen ancestry.

The case of Loran Lockhart<sup>12</sup> can be explained in no other way than by the acceptance of the theory now presented. This boy, blind up to his seventh year was enabled to have imperfect vision by a series of operations for double complete cataract. He then began drawing and painting at a level equal to or above normal children of his age. This ability has continued. A thorough investigation failed to reveal any possibility of environmental help or stimulus. Presence in the ancestry of craftsman ability and other aspects of his general constitutional inheritance provides the only means of accounting for the facts of the case.<sup>13</sup>

<sup>11</sup> The address list was taken from the American Art Annual for 1936 and apparently artists are prone like any other group to move frequently and fail to leave forwarding addresses.

<sup>12</sup> Presented in *Psychol. Monogr.* **48**, No. 213 (1936). See Meier, Art Ability without Instruction or Environmental Background: Case Study of Loran Lockhart, 155-163.

<sup>13</sup> Loran is now attending the Missouri School for the Blind, at St. Louis, learning Braille, and was visited last by the author in April, 1937, three years after the first contact. His vision, as stated by the Superintendent, is about 70% normal, but he will have to depend upon Braille for his major reading activities. Now eleven, he is a very popular student and regrets that the requirements of Braille learning prevent his giving time to his drawing and painting which is, however, indulged in during summer months.

*II. Energy output and perseverance.* One of the striking characteristics of the work-habits and energy-outflow of the talented child and adult is the concentration upon the task at hand for indefinite periods. The usual time for staying with any activity on the part of pre-school children is brief. A few marks on the paper with crayon or a brush satisfies many children; some do not bother to spend any time at the easel.<sup>14</sup> The artistically talented children referred to above were first identified by their frequent use of the easel and the length of time working at it. The predisposition to occupy oneself at such activity is so pronounced that in a number of cases the child on reaching third grade was denied the usual art period for a time because he was neglecting other activities. In summary it may be said that the artistically competent child discloses early in life a proclivity to spend concentrated effort frequently in work on art activities and does so in preference to almost any rival interest. At the early teen age the activity may temporarily follow other interests than drawing or painting, such as model building or specimen collecting and mounting. But even these are closely related to the craftsman pattern of activity and serve to enhance the possibilities for development of creative imagination in later endeavors. The same tendency toward deep concentration and care for detail is strikingly in evidence.

In the adult artist the same characteristics prevail. From the extensive notes and observations gained by personal contacts with forty-one established artists<sup>15</sup> the same ability to focalize great energy upon a theme until it is brought to completion is evident. One typical example is presented. Thomas Benton received the commission for the Indiana murals for the State exhibit at the Century of Progress exhibition six months before the date of the Fair's opening. He spent three months in research

<sup>14</sup> Based upon observations at the University of Iowa Preschool laboratories and supplemented with observations of others at other places, and upon individual children. The 'situation' assumes an easel usually available, and nearly always available if the child desires it.

<sup>15</sup> Chiefly at Taos, Santa Fe, Laguna Beach, and Carmel-Monterey; but also in New York City, Toronto, Chicago, St. Louis, Denver, San Francisco region, Minneapolis, and other places. Seven of them represent European birth and training.

(visiting scenes, and people; uncovering historical events in libraries for planning the theme; drawing sketches of the panels). He then spent less than three months in the actual painting (egg-tempera) of the 240 lineal feet of eight foot murals, requiring an uninterrupted energy-outflow of astonishing magnitude. Other instances might be supplied of concentration and persistence that would serve to refute the popular stereotype of the artist as a temperamental, emotionally-unstable, long-haired dreamer.

*III. Aesthetic intelligence.* The Tiebout-Meier study of the relation of general intelligence to artistic ability disclosed a definite tie-up between the two.<sup>16</sup> The relation was in evidence in the high school field but was prominently in evidence in the ascertained scores of fifty-one nationally known artists, representative of various types and all of definitely high standing. Although in the test instrument used<sup>17</sup> it was not found by a break-down of the test elements into categories that the artists as a group were particularly strong or weak in any one category, it is possible that the more detailed analyses of mental functions now being studied may show the artist type of mental habits probably stronger in *visualizing*, *speed in perceiving*, and possibly several more, than in others like *facility with numbers* or *verbal fluency*.

The studies of the talented children in the Iowa City group disclosed one subject who tested variously<sup>18</sup> as having an IQ of 154, 136, 140, 155, 166, 141, 140, 130 when tested at different times, which averages 145 or near genius intelligence. Another tested at different times disclosed IQs of 133, 132, 135, 149, 116 or an average of 131 which is in the very superior category. Others disclosed average IQs of 134, 133 and 124. These are children who have been followed for a period of over ten years. These were paired with children in the same environment and with comparable IQs (as 112 and 111; 124, 124; etc.) who have not exhibited artistic preference to any considerable degree even

<sup>16</sup> *Psychol. Monogr.*, 1936, **48**, No. 213.

<sup>17</sup> Otis Self-Administering.

<sup>18</sup> Administered by Iowa Child Welfare Research Station.

when stimulated, indicating that intelligence alone does not account for superior artistic talent.

Both in the case of the talented child and the adult artist superior intelligence conditions the rate of development and the functioning of other factors.<sup>19</sup> It ordinarily determines the artist's competency in handling a given theme and the adequacy of his treatment. Other things being equal it may mark the general effectiveness of the work on the whole.<sup>20</sup> It may partially mark the degree of originality (entering into creative imagination) and the range of possible ways of treating a given subject.

*IV. Perceptual facility.* By this factor is meant the relative ease and effectiveness with which the individual responds to and assimilates experience which has potential significance for present or future development in a work of art. The Tiebout investigation disclosed that one of the significant differences between the talented and the non-talented was the relative effectiveness in response to the visually-experienced subject-matter coming before the subject.<sup>21</sup> The talented children not only 'carried away' more of identical objective materially visually experienced but also retained it in approximately the same ratio. The Grippen study supplied additional supporting evidence.<sup>22</sup> The artistically superior child is thus one who 'drinks in' more of a vacation trip, movie, or graphically presented story and retains the impression better, than does the 'average' child. His perceptions of this type are therefore more adequate, and his memory for visual experience more lasting and to a greater extent available for recall.

With the adult artist this facility takes the form of more realistic and adequate 'note taking' when in the presence of a scene, interesting 'character' or imagined or re-constructed historical episode. On meeting a person for the first time, and in the event that the person met constitutes a possible subject

<sup>19</sup> Aesthetic judgment and creative imagination.

<sup>20</sup> A conclusion arrived at by Manual. See Manual, H. T., *A study of talent in drawing*. Bloomington, Ill., 1919.

<sup>21</sup> *Psychol. Monogr.*, 1933, 45, No. 200, pp. 108-133.

<sup>22</sup> *Ibid.*, pp. 63-81.

for a later painting, the impression may be one, compared to that ordinarily experienced, of considerable clarity, in which most of the distinctive features and details are well noted.<sup>23</sup> In the case of the landscape painter the possibilities of a given landscape as a subject for a painting would be quickly reviewed, and the trial-and-error procedure in actual sketching considerably reduced.

An example may clarify the trait. Again Thomas Benton: many of the themes of his paintings have been gleaned from his many leisurely automobile sketching trips in the Appalachians, the southern States and in the southwest. Whenever he chanced upon a scene, a bit of local color, a 'character' or a meeting place of a religious sect the sketch would be made, to be added to the rich collections obtained in his various trips. Back in his studio he organizes this material into compositions, models them in clay, makes a color sketch and paints the picture. Probably but little of the original experience is lost. The ability to work in this fashion presupposes a facility for keen observation, for entering into the personality he is studying (empathy), and of making many subtle observations without appearing to do so.

The factor of *perceptual facility* is well illustrated in the description by Benton of his impression of a New Mexico sunrise which is quoted in part below.<sup>24</sup> The contrast with the perceptually deficient individual is noteworthy.

"The next morning I woke up before dawn. Against the whitish sky to the east a chain of black mountains rose. As the sky turned pink the mountains became blue. There was a bright star hanging in the sky above them. This dawn on the desert was the most beautiful thing I have ever seen. It was moving. It was like the music of some old chant of the early Church, delicate, exquisite, and sad. I walked away from the car. I cherished the sense of great peaceful loneliness the scene gave. I felt like wandering off into the blue, violet, and orange-pink planes that hung in

<sup>23</sup> It is recognized that much of this is learned, probably the functioning of a set of observational habits. The point at issue is, however, that such a set of habits would be difficult for the person not so natively equipped to foster—perhaps next to impossible in some.

<sup>24</sup> By permission of the author. From Benton, T. H., *An Artist in America*. New York: McBride, 1937, pp. 236 ff.

transparent sheets from the top of the sky to within a few yards of my feet. The earth and the sky were as one. There was no distinction between what was solid and what was not. The universe stood revealed to sense as a great harmonious unity, as one thing. . . .

"When the sun came over the mountains to the east, the world became what it is. In the place of the one thing there were many things big and little. There were ants at my feet, there were yucca plants and clumps of sparse grass. Way over on the side of a hill, little round bumps of pinon pine squatted in black irregular rows. Beneath another hill about a half mile ahead was a ranch house with a windmill. A scrubby cottonwood tree grew by the windmill. We felt as if we were utterly removed from the possibility of further contact with civilization. Yet the highway from Albuquerque to Gallup was just the other side of the hill below which the ranch house lay. We found it in fifteen or twenty minutes after we started. Where our trail joined it there was a store and a gas station. The boy in charge there was from Newark, New Jersey. He hated the country.

"'This place is too lonely for me,' he said. 'There ain't a damn thing to see.' I judged he had not been up in the dawn of that morning."

*V. Creative imagination.* Inasmuch as this term is in wide use and is perhaps little understood by its users, it is proposed that the simple designation be given as the ability to utilize vivid sense impressions effectively in the creation (organization) of a work having some degree of aesthetic character. There is no need for mystification, nor assumption of creation 'out of one's mind'—which does not make any particular sense. One does not construct 'out of' unless some basis for such construction is there. And that can come only from one's experience, or as is usually the case from composites of experience.

Because the experience of children is usually simple, uncluttered and vivid many of their constructions have a naivete and charm to adults which the work of older children and other adults does not have. Similarly the emotionally charged but simply experienced observation of a charging or grazing animal afforded primitive man the material for an expressive picture which

excites admiration in modern people. The Grippen study<sup>25</sup> presents the various ways in which creative imagination functions in children's art experiences. It is evident in the child's sphere as well as in the adult's that the adequacy of perceptions is a fundamental pre-condition for effective creative imagination but it should be noted that the manner of retention of experience does not necessarily lead to an effective organization of this material. In the case of the small child, organizations recognizable as effective are probably accidental in many instances, although the ability to manipulate sense-data and bring in new material may come into the work of an artistically superior child at almost any period.

The dependence of creative imagination upon elements entering into the past experience of the individual is well illustrated in the methods of Hovsep Pushman who is regarded as one of the great still-life painters of all time. Mr. Pushman has traveled widely and has accumulated an extensive collection of objects of art from various parts of the world but particularly from China, India and the near East. This collection in his New York studio constitutes a veritable private museum and includes several hundred frames which are of such variety and character as to make it possible when his painting is completed to select one that is extremely well-fitted to the tonal and textural character of the painting. The still-life is thus a product of his unerring selection of objects from his museum, his unfailing aesthetic judgment in arranging these objects to form not only a marvelously beautiful composition but also to provide the material basis for a flawlessly painted composition. In the process perceptual facility, creative imagination, and aesthetic judgment function as a unit guided by a superior aesthetic intelligence. There is also present in the situation a constantly high outflow of energy which utilizes superior manual skill.

An example of creative imagination motivated by an emotional initiation of the theme itself characterizes the production of Grant Wood's *Daughters of Revolution*. Irked by public criticism of persons regarded by Wood as good Americans, Mr. Wood proposed in his own mind to construct a satire which

<sup>25</sup> *Ibid.*, pp. 69 ff.

would have the broad significance of depicting the contrast between comfortably housed, elderly ladies who discuss people and issues at teas, with the actual hardship experienced by ancestors five or six generations removed. Hence the employment of contrast of color and the inclusion of Leutze's *Washington Crossing the Delaware*. It is to be noted that the incentive for this picture was a succession of news items; the creative part wherein imagination functions is in the manner in which Mr. Wood sought out and utilized photographs which would serve as a vehicle for the satire. The three faces in the picture are constructs though based upon a study of many photographs, the actual identity of the persons being unknown.

*VI. Aesthetic judgment.* As a factor in artistic competence, aesthetic judgment is probably the most important. The two best established tests for artistic ability have singled out this quality for almost exclusive treatment.<sup>26</sup> Simply defined, aesthetic judgment is the ability to recognize aesthetic quality residing in any relationship of elements within an organization. It is vital to the artist in that good aesthetic judgment permits him to know when his composition is good or unsatisfactory and what might be done to improve it. It is also the basis for art criticism and underlies the appreciative aspect of the aesthetic response. Studies<sup>27</sup> show that it is present in children to some degree but it undoubtedly is subject to considerable development through learning and experience. It is probably never completely mastered by anyone.

In the interests of clarification it should be understood that aesthetic judgment is not the application of a series of rules but is something which the individual acquires on the basis possibly of some innate neuro-physical constitution. His own individual manner of attaining aesthetic quality is always his own in the sense that a quality such as balance even with the same materials may not be attained in exactly the same way even by repetitions of the same organization. It is likewise true that the general goal of all aesthetic organization—namely unity—is seldom

<sup>26</sup> Meier-Seashore and the McAdory.

<sup>27</sup> *Psychol. Monogr.*, 1933, 45. Studies by Daniels, Jasper, Whorley, and Walton.

arrived at by pre-conceived design but simply emerges on the completion of a composition. Unity is probably never perfect but is attained in varying degrees of success.

From repeated observations on artists in their manner of work, their personal habits, tastes, and manner of arriving at their aesthetic judgments, the author proposes that there is a probably hitherto unsuspected relationship between craftsman heredity and the higher degrees of aesthetic judgment constantly in evidence on the part of many artists. Viewed in this sense aesthetic judgment is fundamentally referable to pride in orderly arrangement. Craftsman skill being a care for nicely proportioned relationships, good all-over design, and infinite and persistent effort in the attainment of good finish, it appears reasonable to assume that the same personal concern for orderly arrangement in a painting or a simplified and unified design characterizes the artist. If this is true then the six factors all become more or less related.

It is not to be assumed that artistic aptitude consists in high degrees in all six factors, but it is necessary to assume that at least some of them must be present in any kind of individual who will make any kind of headway in the field. We may expect that the ultimate progress of the individual is somewhat related to and conditioned by the degree to which he possesses most if not all of the six factors.

Undoubtedly there may be instances of conspicuous success in art which will not be explained on the basis of the factors as set forth. In such cases these factors may be operating, but in a manner not readily discoverable. It may be, moreover, that a strong drive, either motivated by intense ambition or by social pressure may have urged the person on to extraordinary effort to achieve in the art field. Possibly also he may have been motivated by unusually stimulating and expert training. The writer believes however that in all such cases some of these factors would be found present if the manner of work of the individual were studied closely and if all of the facts of his life and ancestry were known.

## GENERAL IMPLICATIONS OF THE INTERLINKAGE THEORY

Inasmuch as the theory set forth touches upon the nature-nurture controversy, it is desirable that certain aspects be clearly understood. The writer has long shared the conviction of careful students of this problem that the explanation of psychological phenomena is not to be found in an all-or-none explanation. It is as wrong to assume that artists are "born" as it is that artists are "made". A public which insists upon extreme simplification has seemingly demanded an answer in one direction or another. Neither long study of hereditary charts nor the supposedly rigid control of environmental influences has offered convincing evidence in either case. Nor does it seem profitable to attempt to find which is the more influential of the two.

In the case of artistic capacity as investigated over a fifteen-year period, such evidence as is presented and checked against the known view-points of present-day biology seems to suggest that some aspects of the capacity are largely attributable to the factor of *stock inheritance* and others to be more attributable to learning but the writer wishes to point out that the hereditary factor referred to is not heredity in the sense of direct inheritance; furthermore, that the environmental aspect is not environmental influence in the usual sense, but a relationship between the individual and his aesthetically significant environment wherein the individual himself takes the initiative. Nature and nurture are here not separate elements since neither act directly but rather inter-act in a dynamic, total situation. The six factors outlined above are therefore more a *series of conditions which, when present, interact with the energies of the individual to develop his artistic competence*. The individual therefore, not the inheritance nor the environment, is the final determiner in the situation. The person may have the constitutional stock in the same manner possessed by a long line of craftsmen ancestors, but he may not wish to develop the potential skill present; he may prefer to sell bonds or engage in law practice. He may have the temperamental trait of perseverance with inexhaustible energy reserves; but he may wish to apply it to scientific research. He may have the general intelligence demanded of the higher grades

of artistic activity but he may wish to use it in teaching or business. He may have the peculiar perceptual facility which goes with the artist-personality; but he may wish to use it for nature study or biological research. The special ability known as artistic capacity, refers therefore to developmental potentialities which when used through the volition of the individual lead to extraordinary accomplishment in the area. It is up to the individual and to no one else to bring this about.

It is the thesis of the writer that the person with the six factors *can* bring this end about and that the person without these factors *can not* bring this about to any great degree. The position is, therefore, a deterministic point of view—deterministic in the sense that certain neurophysical and developmental factors seem to be normally a *pre-condition* for the rest of the total development and that these pre-disposing conditions are not present equally in all persons nor if absent can they be established. The nature-nurture aspect is hence anything but a simple matter. The factors are not only interlinked in the gross aspects, but they are interlinked and condition one with the other in a dynamic sense—*i.e.*, the interrelationships may change with time and may exist in varying potencies with different individuals. There are probably no two individuals who present identical composites of factors to begin with and these composites are probably different at each stage of development. It is firmly believed nonetheless that in all cases the *general pattern* is that described above, involving the factors of motor skills, the volitional-temperamental traits of energy-output and perseveration, intelligence, habits of perceiving, special utilization of imagination and a special disciplining of judgment and critical processes. Paradoxically as it may seem, it is yet noteworthy that while the basic fact remains that artistic capacity rests upon a general stock inheritance, even the *acquired phases* relating to perception, imagination and judgment are themselves *conditioned by this inheritance*. The unique contribution which these fifteen years of investigation have made is the knowledge that all these factors are in a peculiar and unique manner *interlinked* and the entire dynamic process is a closely knit, interdependent and evolving development.

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WHOLE NO. 251  
1939

# Psychological Monographs

EDITED BY  
JOHN E. DASHIELL  
UNIVERSITY OF NORTH CAROLINA

## STUDIES IN THE PSYCHOLOGY OF ART

Volume III

EDITED BY  
NORMAN C. MEIN

UNIVERSITY OF  
STUDIES IN PSYCHOLOGY  
No. XXIII

PUBLISHED BY  
AMERICAN PSYCHOLOGICAL ASSOCIATION, INC.  
PUBLICATIONS OFFICE  
THE OHIO STATE UNIVERSITY, COLUMBUS, OHIO

PUBLICATIONS OF  
THE AMERICAN PSYCHOLOGICAL ASSOCIATION

WILLARD L. VALENTINE, Business Manager

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